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THE APPLICATION OF MEDICAL SCIENCE TO THE INDIVIDUAL

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Many years ago I read somewhere a brief description of medicine attributed to Marchand, an eminent teacher of the old and glorious German school of medicine. His words impressed me deeply, and fortunately I wrote them down. I say fortunately, because I have no trace of where I saw them, or who translated them from the German, and they remain like the memory of a kindly and gracious act done by some passing stranger in a crowded street. These words I have kept before me through the more mature years of my medical career, and have weighed their value against the teachings of experience. I have quoted them on former occasions to express a medical ideal, but today I repeat them not as an ideal, but because of the conviction that they briefly express the essence of medical service. It is with these words of Marchand as a text that I wish to discuss the application of medical science to the individual. They are as follows:

"Seek truth. Discover causes. Learn how they disturb life and how order is reestablished. By science and persuasion preserve men. By science, gentleness and firmness combat death and reduce suffering. Guide, encourage and console in a brotherly and tolerant spirit. This is medicine."

In these few words equal consideration is given to the science and to the art of medicine. The essence of medical science is expressed in the first three phrases: "Seek truth. Discover causes. Learn how they disturb life and how order is reestablished." It is clear that these principles of science are meant to be applied not to the study of a reaction in a test-tube, or to a phenomenon that can be observed only in the laboratory. They are meant to be applied to the study of the sick human being by the doctor using any means that will reveal truth, that will discover causes and that will teach him to understand disturbances of function and of structure, and give him knowledge of how to bring life back as far as it may be done, into a state of vital harmony which we think of as health. These few words could be readily expanded to stretch before us a wide view of the disciplines that constitute much of the medical curriculum of our schools.

We cannot learn how life is disturbed and how order is reestablished without a knowledge of normal, healthy man, as revealed to us bit by bit in the study of anatomy, physiology and biochemistry. We cannot discover causes without some knowledge of pathogenic micro-organisms, pathological processes and derangements of functions. Nor can we learn how order is reestablished without a ground-work of pharmacology and surgical procedures. We must learn to seek truth as related to the human body and mind by special forms of searching. The trained eye, the listening ear, the sensitive finger guided by the mind that is prepared are essential for success in seeking the sort of truth that is required. Technical proficiency in the use of methods and instruments and the ability to discern the essential from the insignificant all play a part in seeking truth regarding the human organism. We as doctors have before us the most intricate and confusing tasks of science, but at the same time, the most interesting, fascinating and

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varying problems that man is called upon to study. Let your own imaginations sweep across the multitude of situations in the realm of medicine and you will need no further enumeration to convince you that the tenets of science are the only safe guide to the solution of the problems that modern medicine has to face. It is no wonder that specialism is inevitable, and that many hands and many minds are now required to perform the tasks attempted by a single pair of hands and a single mind in years gone by. It is no wonder that hospitals are necessary, when team-work, consultation and technical proficiency are needed to meet the demands of present-day medical science on serious occasions when life or chronic illness may be in the balance.

But there is more to medicine than science. There is the human relation between doctor and patient. It is not by a cold and calculated process that medical science can be applied to the needs of the individual. There are many variations in the conditions and situations of human beings, obviously determined by age, sex and race, and less obviously by constitution and personal characteristics, by inheritance, childhood experiences, education, economic status and many other factors. It is these variations that led the philosopher John Dewey to write, "Just in the degree in which a physician is an artist in his work he uses his science, no matter how extensive and accurate, to furnish him with tools of inquiry into the individual case, and with methods of forecasting a method of dealing with it. Just in the degree in which, no matter how great his learning, he subordinates the individual case to some classification of disease and some generic rule of treatment, he sinks to the level of the routine mechanic. His intelligence and his action become rigid, dogmatic, instead of free and flexible."

Sauerbruck expresses somewhat the same idea from another viewpoint when he writes, "Physiology, chemistry and biology are useful aids in the search for medical truth, but will not of themselves, alone or together, explain the obscure system of events that constitutes the entity of human disease." Thus an eminent philosopher recognizes the necessity of individualizing medical service if we are not to sink to the level of the routine mechanic, and a leader in surgery tells us that the fundamental sciences are not enough to explain the obscurities of human illness. Medical service requires more than science as it is defined and understood today.

Let us return to Marchand for the answer to the question as to what more is needed. At first he clings to science but adds persuasion as a means of preserving men. "By science and persuasion preserve men." He recognizes that science alone is not enough in seeking that broad and all-inclusive objective, "preserve men", but that the reaction of one person to the persuasion of the other must be added. He then tells us how persuasion should be carried on, but still science precedes. "By science, gentleness and firmness combat death and reduce suffering." Here the emphasis is shifted from the general to the specific and he calls upon us to use gentleness and firmness in performing the tasks required to combat death and to reduce suffering, and bids us to combine these attributes of behavior with science in the study and care of the patient who is in danger and who suffers.

Marchand then lays down very simply and directly the guiding principles for the attitude of the doctor toward his patient in these words, "Guide, encourage and console in a brotherly and tolerant spirit." Here he tells us not only what we should strive to do in order to make our service and ministrations of the greatest value, but also the spirit in which it should be done. A brotherly spirit is that of equality, as there is no other human relationship where so many factors of inheritance and of possession exist in common as in the relationship of brothers. A tolerant spirit is that which is as free as possible from judgment of the conduct of another. "Judge not, that ye be not judged" expresses an attitude that should always exist in the personal doctor-patient relationship, and unless it does exist, efforts to guide, encourage and console may go for naught.

Finally, after the science of medicine as the primary requirement of medical service has been combined with the functions of the physician toward the individual and the spirit of medical service has been described, Marchand exclaims, "This is medicine." The longer I have pondered over this description of medicine, the more firmly have I become convinced that this final phrase is true and justified.

There are some practical lessons in this concept that we have examined, and my own

studies of hospital patients have demonstrated conclusively that even under conditions most favorable for the application of science in the study of disease, there are elements of illness that require the study of the patient as a person or, in other words, as an individual with a definite place in society and with a conception of how he should live and behave in his own particular social situation. Because the patient is ill, his social status is disturbed, and it is with the hope of being restored to his normal life that he seeks medical aid. Disease, it is found, is only one factor of illness which prevents a normal way of living in a large majority of patients admitted to the medical service of the Johns Hopkins Hospital. Fear, worry, emotional tension and sometimes hate, also play a part in causing physical disability and suffering.

Let us take for example a specific study[1], an unselected series of fifty patients coming to the medical dispensary for digestive symptoms. As indigestion, to use the popular name, is notoriously prone to occur with emotional disturbances, this example cannot be generally applied to other types of illness, but in this series of patients 76 per cent had symptoms referable to emotional strain. There were 31 patients, or 62 per cent, in whom no evidence of disease could be found to account for their symptoms, and in 27 of them, or in more than half the number studied, just plain worry, although often excessive, was the cause of illness.

This study was made by inviting the patients, after their physical status had been determined, to sit quietly in a little office where they were encouraged to talk about their situations, their work, their families and their worries. What they said was recorded in detail, and when put together with the usual clinical record, gave us material for the study of the patient as a whole.

Among this group of patients representing a fair sample of those with digestive symptoms, there were several men with good industrial records overtaken by advancing years and by the insecurity involved in their situations. There was a young wife whose family doctor told her she had a mild case of gastric ulcer, and whose friends told her that this was an incurable disease. A thirty-one year old Polish housewife, with a Portugese husband, had been ill for two years because her husband and her father, whom her husband supported, were constantly in disagreement. A farm worker's wife of thirty-six had suffered both in mind and body for three years, ever since listening to a radio health talk in which the early symptoms of cancer of the stomach had been described. Her abdominal pain had been constant for a year, and she had made all her funeral arrangements before coming to the hospital, in spite of the fact that careful examinations failed to reveal any evidence of disease. For three years this patient had never failed to listen to the weekly radio talk which had initially precipitated her illness.

The story of a young married baker of twenty is especially striking as an example of how worry may be a cause of illness, how it may disturb life, and how order may be reestablished. After a fruitless search for an organic basis of most distressing choking spells, weakness, and shortness of breath which brought this young man, he thought, near to death, he reluctantly confessed to a fear of tuberculosis. His symptoms had begun at the time of his marriage seventeen months before he came to the hospital and had increased in severity as his wife approached the time when her first baby was expected, a few weeks later. He finally told the story which explained his anxiety. An older friend who lived next door was found to have tuberculosis at the time of his marriage, and died six months after his first child was born. The patient thought the same fate was in store for him, especially as his mother had repeatedly warned that he might have contracted the disease from his friend, and that his wife might have it. She even went so far as to say that he would probably die of it if he did not stop playing the saxophone and staying up late at night to play with an orchestra. Assurance, a lecture to the mother, and the arrival of a fine son effected a speedy cure in this case.

All the patients that have been mentioned recovered completely and remained well during succeeding months as long as they were followed, and the same may be said for nearly all of the twenty-seven patients in whom worry was the cause of illness. Their problems were brought out into the light and their symptoms explained by combining in hospital practice the efforts of the specialist with the traditional methods of the family

1. The studies referred to in the address were supported in part by grants from the Josiah Macy, Jr. Foundation and from the John and Mary R. Markle Foundation.

physician. In many instances the function of the physician to guide, encourage, and console in a brotherly and tolerant spirit, had most to do in solving the problems of these patients.

The mind as well as the body must be studied in an effort to discover causes, and even when the presence of organic disease has been established, the emotional disturbances can by no means be overlooked as a possible cause in making up the total picture of illness. In fact, there are certain diseases that usually have their accompanying emotional strain which cannot be overlooked if medical service is to be skilful, adequate and satisfying to the patient.

Let us close then with the thought that the art of medicine is the application of medical science to the needs of the individual, and that in order to combine the art and the science of medicine, much study and thought must be given to the sick or injured patient as a person, to be treated as an individual problem.

CARCINOMA OF THE BRONCHUS

*Some Findings in Twenty Cases**

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Bronchogenic carcinoma is a common condition, and appears to be increasing. Textbooks of a decade ago stated that it constituted about 1 per cent of all carcinomas, while today it comprises at least 10-12 per cent of all cancers[1]. It is found with the greatest frequency in the so-called cancer age, and is more frequent in males than in females. In this series 17 patients were males; 3, females — a ratio of 5.7:1. The average age was fifty-seven. The oldest patient was sixty-eight; the youngest, forty-two. Six were in the fourth decade, 5 in the fifth and 9 in the sixth. All 20 belonged to the white race.

There is no accurate knowledge of the etiology of bronchogenic carcinoma, although there seems to be a definite relationship between it and pre-existing inflammation in

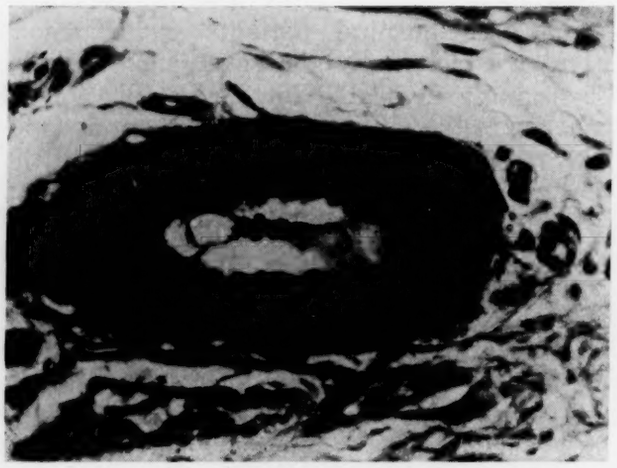

Fig. 1a. The above photomicrograph shows a terminal bronchiole with surrounding loose connective tissue. The epithelium is of the simple columnar ciliated type with the nuclei at one level. At the base of the cilia there is a dark border line formed by the basal corpuscles of the cilia. Between the columnar cells on the right and on the left, active goblet cells may be seen. In these areas there is a break in the outline of the columnar cells.

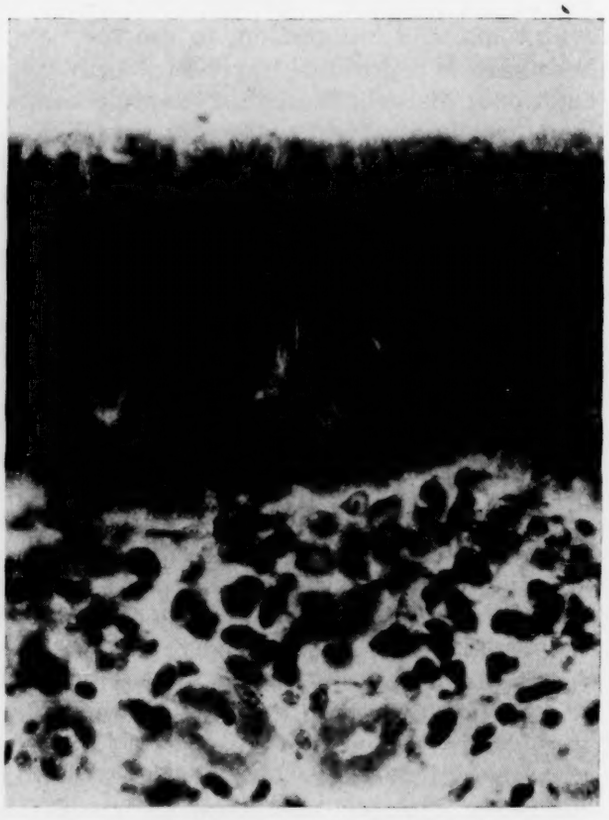

Fig. 1b. The above photomicrograph is made from a section of the upper trachea, and shows the stratified columnar cells with cilia. In one or two areas the cilia are indistinct where the goblet cells break through to the free surface at the base of cilia. The nuclei are at all levels, with an even, orderly row of cylindrical nuclei forming the basal layer, beneath which there is a thin basement membrane (Bowman's membrane). The epithelium shows no variation from the normal.

*From the 1937 records of the Bronchoscopic Clinic, Kings County Hospital, Brooklyn, New York. The author wishes to thank Dr. M. C. Myerson, Director of the Bronchoscopic Clinic, for his permission to use these cases in this report.

Read before the Section on the Practice of Medicine, Medical Society of the State of North Carolina, Bermuda Cruise, May 13, 1939.

1. Clerf, L. H.: Carcinoma of the Bronchus, Radiology 28: 488 (April) 1937.

the lower respiratory tract[2]. A family history of cancer was obtained in one case.

Histologically the bronchial mucosa consists of a layer of ciliated columnar cells resting on a basal cell layer of ovoid cells. Deep beneath the basal cell layer lies the sub-mucosal tissue, consisting of areolar, fibrous and elastic tissue, and containing numerous mucous glands. (Fig. 1.)

In the presence of chronic inflammatory processes in the bronchi, the ciliated columnar epithelium is often found to change to squamous-celled epithelium. Ormerod[3] has demonstrated the change from one type to the other in a single field. Fried[4] considers the basal cell layer responsible for the regenerative processes. The pathology of these tumors has been of interest to pathologists for many years, but they have not agreed upon which of the first two layers is responsible for the formation of squamous-celled carcinoma. The adenocarcinomas probably arise in the mucous glands of the submucosal layer. Halpert[5] states that all bronchogenic carcinomas arise from the "reserve cells" of the basal cell layer by atypical proliferation.

The macroscopic appearance of the tumors in 19 cases could be classified as fungating, submucous and polypoid. Twelve presented themselves as fungating, friable masses; five as submucous growths; two as polypoid; and the twentieth in the series was undetermined.

As to location, the distribution was fairly even. Eleven were located on the right side and nine on the left. Seventeen were located in the main bronchi and were visualized by bronchoscopy. The remaining three originated in a peripheral bronchus. (Fig. 2.)

The local pulmonary and general symptoms, by themselves, are not diagnostic. When cough, with or without sputum, hemoptysis and dyspnea, occurs for the first time in an individual of the cancer age, especially when associated with pain, carcinoma of the lung should be highly considered.

Cough of duration from one month to ten years was present in 18 (90 per cent) of the cases, and was found to be the most constant symptom. It was productive in 13 cases (70 per cent).

2. Miller, J. A., in Musser, J. H: Internal Medicine, Philadelphia, Lea and Febiger, 1932, p. 616.
3. Ormerod, F. C.: The Pathology and Treatment of Carcinoma of the Bronchus, J. Laryng. and Otol. 52:733 (Nov.) 1937.
4. Fried, B. M.: Primary Carcinoma of the Lung, Baltimore, Williams and Wilkins, 1932, p. 46.
5. Halpert, B., cited by Ochsner and DeBakey (9).

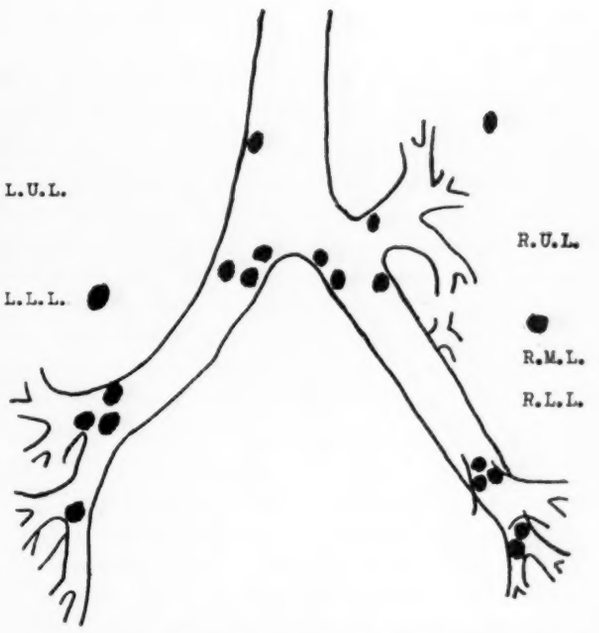

Fig. 2. Distribution according to the side involved and the area from which biopsy was taken.

The second most prominent symptom was chest pain. This occurred in 14 (70 per cent) of the cases. Pain due to carcinoma of the lung is found to be more continuous than that due to any other intrathoracic condition, with the possible exception of aortic aneurysm. It has been said that its persistency and intensity almost puts it in a class by itself. The pain in 9 cases was referred to the side of the lesion. In 2 cases it was referred to both sides of the chest. In the remaining 3 cases, the historian only mentioned that pain in the chest was present. In 2 cases chest pain was the only pulmonary symptom.

Hemoptysis was present in 10 cases (50 per cent), ranging in duration from one month to six years. It is interesting to speculate as to the possibility of a benign adenoma undergoing malignant changes in the bronchus of the patient who had hemoptysis for six years.

Dyspnea was present in 4 cases (20 per cent), and occurred late in the course of the disease.

Of the general symptoms, loss of weight, weakness, and night sweats, in the order mentioned, were the most prominent. Only in few of the cases did the general symptoms cause the patient to seek hospitalization.

Other than thoracic pain, symptoms suggestive of metastasis to the ribs were present in 2 cases, to the cervical vertebrae in 1, to the thoracic vertebrae in 1, to the head of

the femur in 1, to the pelvis in 2, and to the brain in 1.

In these cases the recorded physical findings, together with the history, suggested the presence of carcinoma, tuberculosis, bronchiectasis, empyema or pneumonia.

No physical signs are pathognomonic of this disease, and cancer is capable, depending upon its size and location, of imitating any disease found within the chest. The most common condition with which it is confused is tuberculosis. Twenty-five per cent of the cases in this series were clinically diagnosed as tuberculosis. This is easy to understand when we stop to consider that these two conditions have symptoms, signs and roentgenographic appearances in common. Roentgenographic appearances that occur in tuberculosis and are not seen in untreated cancer are fibrosis and calcification; yet it must be remembered that both diseases may be present in the same patient and that one positive sputum is at times misleading. One positive sputum may be a laboratory error, or the neoplasm may invade an old tuberculous encapsulated focus and liberate a few bacilli. Repeated search for the presence or absence of tubercle bacilli is most important. The diagnosis of tuberculosis as final on one positive sputum with roentgenographic findings of atelectasis, consolidation, cavitation or nodulation may deprive a cancer patient of his chance for recovery. Two of the patients in this series had one positive sputum.

In reviewing 1286 autopsy reports at Sea View Hospital, Schwartz and Auerback[6] found that thirty-two patients sent to the hospital as cases of advanced pulmonary tuberculosis were found to have non-tuberculous pulmonary disease without any evidence of tuberculosis. Sixteen, or 50 per cent of these cases, were classified as bronchogenic carcinoma. In 12 (75 per cent) the new growth occurred in the large bronchi. Anatomic review of the gross pathological reports indicate that in 9 cases (75 per cent) the growths were within reach of the bronchoscope.

An example of the difficulties of diagnosis is found in one of the first reported cases, by Graves[7], one hundred years ago. Since his time the history, course of the disease, and physical findings have remained the same, but several important diagnostic aids have been added. These procedures which do not require metastasis before they can be used are:

(1) Roentgen-ray picture and fluoroscopic examination.
(2) Bronchoscopic examination and biopsy.
(3) Lung puncture.
(4) Microscopic examination of biopsy and lung puncture specimens.

The fluoroscopic examination and roentgen-ray pictures are of great value and should be the first step toward a positive diagnosis. The fluoroscope is of help in revealing bronchial ball valve block and in differentiating between mediastinal and lung neoplasms. Serial roentgenography is of much more value than a single film.

Varied pictures are obtained, depending upon the size and location of the neoplasm, and they may be similar to those seen in other lung conditions. Lobar consolidations may be produced by tuberculosis, pneumonia, abscess, and cancer. Cavities may be produced by abscess, tuberculosis, bronchiectasis, cancer, and gangrene. Miliary deposits may be caused by tuberculosis, cancer, broncho-pneumonia or pneumoconiosis. Large nodules are formed by neoplasm, tuberculosis or silicosis. Atelectasis may be secondary to tuberculosis, cancer, bronchiectasis, endobronchial neoplasm or foreign body. Fibrosis and calcification are not seen in cancer, although fibrosis may be present in those cases which have received x-ray or radium therapy.

In this series, from the x-ray findings, 16 cases were diagnosed as new growths, 2 as inflammatory, and in 2 the diagnosis was deferred. Masses were seen in 8, atelectasis in 9, pneumonic consolidation in 1, and pleural effusion in 3. X-ray evidence of metastasis was present in 5 cases.

Bronchoscopy with biopsy is the only method that we possess to make a positive diagnosis early. In 70-85 per cent of cases a positive diagnosis can be made by bronchoscopy and biopsy.

These tumors present a varied bronchoscopic appearance. In the majority of the cases, tumor tissue is encountered. In others, where the lesion is submucosal, the bronchus

6. Schwartz, S. and Auerback, O.: Non-Tuberculous Pulmonary Disease Simulating Pulmonary Tuberculosis, Sea View Hospital Quarterly Bulletin, vol. 4, no. 1 (Oct.) 1938.

7. Graves, R. J.: A System of Clinical Medicine, Dublin, Fannin and Co., 1843, p. 792.

is narrowed, the mucosa thickened and inflamed, and evidence of mediastinal involvement may be present or absent. In those cases where the tumor is beyond a third order bronchus, the bronchoscopic picture may be normal or evidence of mediastinal involvement may be present, varying from encroachment of lumen by metastatic hilar lymph nodes to widened, thickened, and infiltrated carina or a "frozen" tracheo-bronchial tree.

Tumor masses were seen in 10 cases. In 5, the growth was submucosal. In 2, friable, polypoid masses were seen. In 17 of the cases, positive biopsies were obtained by bronchoscopy. In the remaining 3 cases, one presented purulent secretions coming from the right upper lobe bronchus; another showed post-irradiation changes in the bronchial mucosa (X-ray therapy had been given in another hospital); in the third case, the tracheo-bronchial tree was normal and a lobectomy was performed. Bronchoscopy was repeated in 4 cases—3 for a second biopsy, and the fourth for bronchoscopic observations following five months of x-ray therapy.

While bronchoscopy does not determine the extent of the lesion, it definitely aids in establishing a diagnosis and assists the thoracic surgeon in selecting the cases which are best suited for operation.

Aspiration biopsies were not made on these patients. Binkley[8] reports 60 per cent positive biopsies in 56 cases. There are usually no harmful after-effects, and this procedure should be used more often if the pathologist is capable and willing to commit himself on the basis of a few cells.

The value of pathological examination of biopsy and lung puncture specimens needs no discussion.

In three cases pleural effusions were present, and in one cancer cells were demonstrated by the Mandelbaum method.

Exploratory thoracotomy is a valuable method of establishing a diagnosis and of determining whether operative removal of the tumor is possible and justifiable.

It is unfortunate that, owing to a late arrival at a positive diagnosis, treatment must often be directed toward relief of symptoms. Five patients received x-ray therapy, and these patients lived an average of two months longer than those who did not receive this form of treatment. One patient lived five months after receiving x-ray therapy. One case was suitable for operation, and expired eight days after lobectomy.

The question of what type of treatment to use after a diagnosis has been made is important. Because of the recent advancements and lowered mortality in thoracic surgery, surgery is the treatment of choice in those cases where the growth, from the endoscopic point of view, is located in such a position that a lobectomy or pneumonectomy will remove it, if the physical condition of the patient will permit either of these procedures.

To date there are 88 reported cases of total pneumonectomy for neoplastic disease. Of the 88 cases 56 (63.6 per cent) died, and 32 (36.4 per cent) recovered. Of the patients who recovered, five subsequently died of metastasis or from other causes[9].

Other methods of treatment are:

(1) Irradiation therapy.
(2) Bronchoscopic removal with or without implantation of radium or radon.
(3) Exploratory thoracotomy with implantation of radium or radon.

The value of x-ray therapy is a disputed question. In early cases, deep x-ray therapy and local application of radium or radon occasionally lead to a cure. In advanced tumors only temporary improvement is obtained, but several months may be added to the patient's life.

Bronchoscopic removal of the tumor is not the procedure of choice, and has been supplanted by other forms of treatment. Bronchoscopic implantation of radon seeds is probably of value, but no definite conclusions can be drawn at the present time regarding its merit.

Favorable results have been reported by radon implantation following thoracotomy.

Conclusions

(1) Symptoms and physical findings are not diagnostic.

(2) Early diagnosis can be made in a large number of cases by close cooperation.

(3) 70-85 per cent of cases can be diagnosed early by x-ray and bronchoscopy with biopsy or lung puncture.

(4) Surgery is the treatment of choice.

8. Binkley, J. S., cited by Ochsner and DeBakey (9).

9. Ochsner, A., and DeBakey, M.: Primary Pulmonary Malignancy, Treatment by Total Pneumonectomy, Surg., Gynec., and Obst. 68:435 (Feb. 15) 1939.

METRAZOL IN THE TREATMENT OF MENTAL DISEASE

and

A Report on its Use at the State Hospital

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In 1935 von Meduna of Budapest, Hungary, gave a report on the treatment of schizophrenia by means of artificially induced convulsions, using Metrazol as the convulsive agent. The remission rate claimed exceeded by far the results attained with the usual forms of treatment, and naturally the entire medical profession as well as the laity became intensely interested in the procedure. In outlining the treatment he made the following suggestions:

Careful physical examination, with special emphasis on the cardiovascular system, should first be made. He listed as contra-indications evidence of coronary disease, history of brain injury, acute febrile disturbance, menstruation, etc. The treatment should be given in the morning, breakfast being withheld. An initial dose of 5 cc. of the 10 per cent aqueous solution is administered intravenously, using as large calibre needle as possible to insure rapid injection. He suggested that a total of twenty convulsions be given at the rate of two or three each week, and suggested that the maximum dose should not exceed 16 cc.

The convulsion is similar to the grand mal seizure of epilepsy, and follows a fairly uniform course. Within ten seconds after injection the patient gasps for breath, blinks his eyelids, loses consciousness, and then passes into the tonic phase of the convulsion. All the muscles of the body are in a state of extreme contraction, the pupils are dilated, and the patient becomes cyanotic. Within twenty or twenty-five seconds the clonic phase begins and continues for an additional twenty or twenty-five seconds. During these phases of the convulsion breathing is entirely suspended. Following the clonic phase the patient is in a state of collapse; cyanosis is extreme and stertorous breathing begins, with rapid return to normal. He is usually in a confused state for an hour or so following the convulsion, when he returns to his pre-convulsive state and is able to resume his usual activities.

It is next to impossible to prove the results of this treatment by statistics, for the following reasons:

1. It is difficult to establish a satisfactory control system. The reasons for this are innumerable, but of primary importance is the wide variation in the duration of individual untreated attacks. We often see cases, especially of manic depressive insanity, clear up in a few days; but we also see cases presenting the same classical symptoms persist for years.

2. Another difficulty in determining results is the lack of uniformity in diagnosis. It seems to those of us who are treating the mentally ill exclusively that we see more and more cases presenting a mixture of schizoid and manic depressive symptoms, and in making the diagnosis we naturally incline to the psychosis with the dominating symptoms. Therefore, in order to arrive at a definite opinion as to the efficacy of this or any other treatment in a given psychosis, only clear-cut cases should be included. In our series many cases showing a mixture of symptoms have been included; consequently, the statistics are of more interest from the standpoint of mental illness in general than from the standpoint of schizophrenia or manic depressive disease in particular.

3. Perhaps the greatest difficulty in appraising results is due to the lack of uniformity in interpretation of results, and until some definite standard is used by all observers the results claimed cannot be conclusive. In tabulating our results we have used the classification suggested by Barbato as follows:

(a)—*Full Remission:* Return to previous level of adjustment; complete insight; no defect in content or affect; and ability to resume former employment.

(b)—*Social Remission:* One of above requirements lacking.

(c)—*Improved:* Two of above requirements lacking.

(d)—*Not Improved.*

Experiences at the State Hospital at Morganton

Much has been written about the size dose required. Our custom has been to give 3½ cc. as the initial dose, and in over 75 per cent

Read before the Ninth District Medical Society of the State of North Carolina at Morganton, September 28, 1939.

of our cases this dose has produced a convulsion. The patients as a rule gradually develop a tolerance for the drug, and when the dose fails to produce a convulsion it is our custom to increase it by ½ cc. on the next treatment day. A decided difference in individual susceptibility has been noted; and, while we have had several patients react throughout the entire series of twenty convulsions to a dose held at 3½ cc., we have used a dose as large as 11 cc.

In our earlier experience we gave three treatments weekly throughout the entire series, but we have since modified this practice to some extent. We are now giving the first five or six convulsions at this rate, and then, if improvement is noted, we gradually extend the interval between treatments until no further improvement occurs.

It has been suggested that a total of twenty convulsions should be produced, but our experience has been that no arbitrary rule should be followed. If improvement is going to occur it usually does so after a relatively few convulsions—ten or less. In only a few cases have we observed a sustained improvement after this number. Almost without exception all patients object violently to the treatment—describe it as a horrible and terrifying experience—and it is our general impression that more can be done by psychotherapy than by repeated convulsive seizures after some improvement has occurred and the patient has become more accessible and developed some insight. It has been suggested that fear of the shock may be the beneficial factor in the improvement noted in these patients, but other authors have disproved this claim.

We have had only one serious accident in over 2000 convulsions. One male patient suffered a fracture of the neck of both femurs in his first convulsion. Dislocated jaws have been noted frequently, but are always easily reduced when the tonic phase of the convulsion has subsided. One patient after her sixth convulsion developed broncho-pneumonia and died sometime later. We do not feel this could be directly attributed to the treatment. Several observers have reported fractures of the bodies of the dorsal vertebrae, many of which produce no symptoms. So far we have been fortunate in not running into this complication.

Relapse, after apparent remission, has been observed in our series in several cases. This has been noted in several fairly chronic cases, and in these two or more series of treatments have been given with the same successful result. In these cases we have now adopted the policy of "watchful waiting"; and with the first indication of relapse we give two or three treatments, which usually serve to hold the patient on a fairly even keel.

The treatment was begun here March 4, 1938, and to date we have had 155 cases under treatment. This report deals only with the first 100 consecutive cases. In six instances it was discontinued because of some contra-indication. We have made no attempt to restrict its application to favorable cases only, but have given it to many who from their chronicity and the nature of their symptoms offered little hope of improvement or recovery. As has been stated, cases of more than two years' duration offer a poor prognosis. In our series 52 cases ill two years or longer were treated, and this, naturally, will affect the recovery rate; yet, in some of these we have observed distinct improvement.

The following tables are presented to complete the statistical picture:

TABLE 1

Results in 91 Cases of Schizophrenia Classified With Respect to Duration of Illness Prior to Beginning Treatment

	Total	*Full Remission*		*Social Remission*		*Improved*		*Not Improved*	
Duration	*No.*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
6 months or less	26	7	26.9	11	42.3	8	30.8	0	0
6 months to 2 yrs.	25	7	28	8	32	8	32	2	8
2 yrs. to 5 yrs.	25	3	12	6	24	6	24	10	40
Over 5 years	15	0	0	1	6.7	7	46.7	7	46.6
Total No.	91	17	18.7	26	28.5	29	31.9	19	20.9

Comment

It is possible that we have been somewhat less generous in our interpretation of results than some other workers, but by combining full and social remissions we see the following results:

In the group ill six months or less we obtained a remission rate of 69 per cent, while 31 per cent improved. None of these cases failed to improve. In the group ill six months to two years the remission rate was 60 per cent. Thirty-two per cent improved, while 8 per cent failed to show improvement.

In the group with a duration of two to five years the remission rate dropped to 36 per cent, while an additional 24 per cent showed improvement. In this group 40 per cent failed to show any improvement. In the group ill five years or longer we obtained a remission in only one case, or 7 per cent of the total. Forty-seven per cent improved, while 46 per cent failed to improve. It will be seen from this that results are inversely proportional to the duration of illness.

TABLE 2

Results in 91 Unselected Cases of Schizophrenia According to Type

	Total	*Full Remission*		*Social Remission*		*Improved*		*Not Improved*	
Type	*No.*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Hebephrenic	27	3	11.1	4	14.9	11	40.7	9	33.3
Catatonic	51	13	25.5	19	37.3	12	23.5	7	13.7
Paranoid	13	1	7.7	3	23.1	6	46.1	3	23.1

Comment

It has been stated by practically all observers that the catatonic type of schizophrenia is more apt to respond to this treatment than the other types, and this is demonstrated in our series, as shown in Table 2.

TABLE 3

Results in 9 Cases of Manic Depressive Disease Classified With Respect to Duration of Illness Prior to Beginning Treatment

		Total	*Full Remission*		*Social Remission*		*Improved*		*Not Improved*	
Duration		*No.*	*No.*	*Per Ct.*	*No.*	*Per Ct.*	*No.*	*Per Ct.*	*No.*	*Per Ct.*
6 mos. or less	Man.	2	2	100	0	0	0	0	0	0
	Dep.	0	0	0	0	0	0	0	0	0
6 mos. to 2 years	Man.	3	2	66.6	1	33.3	0	0	0	0
	Dep.	0	0	0	0	0	0	0	0	0
2 years to 5 years	Man.	0	0	0	0	0	0	0	0	0
	Dep.	1	1	100	0	0	0	0	0	0
Over 5 years	Man.	2	1	50	1	50	0	0	0	0
	Dep.	1	0	0	1	100	0	0	0	0
Total Number		9	6	66.7	3	33.3	0	0	0	0

Comment

Although the number of cases in this series is small, the results obtained are striking. Remissions were obtained in all cases regardless of duration, and there seemed to be no difference in result with respect to the manic or depressive phase of the disease. Of course, it is impossible to say with assurance what the outcome of the cases of short duration would have been without treatment, but in the four chronic cases who remitted and who had been ill two years or longer, the remission seemed to be the direct result of treatment.

TABLE 4

Results in 91 Unselected Cases of Schizophrenia Regardless of Duration of Illness

	Number	*Percentage*
Full Remission	17	18.7
Social Remission	26	28.6
Improved	29	31.8
Not Improved	19	20.9

Comment

Although nothing very startling is shown by this table, it should be kept in mind that in the group of 91 cases 44 per cent were considered chronic, with a duration of two years or longer. In spite of this our general impression is that, taking the group as a whole and considering all of the facts, better results have been obtained than would be expected in the usual treatment of these cases.

We have made an effort to compare the duration of hospitalization in a group of treated cases with a group of untreated cases as similar as could be obtained, and we find a material shortening of the time spent in the hospital. For example, in 16 cases, ill six months or less before admission, the average hospitalization period was three months and four days with treatment; while in a similar number of cases with this same duration of illness the average hospitalization period was eight months and twenty-three days without Metrazol treatment. Similarly, in a group of 12 cases, ill six months to two years before admission, the average stay in the hospital was six months and twenty-five days with Metrazol; while in a similar group of untreated cases the average hospitalization was eighteen months and seventeen days. In the treated cases in this group the average stay in the hospital after treatment was two months and eleven days. Of course, we are fully aware of the expected individual variation in these cases, but these figures do seem to shorten materially the period of hospitalization.

It seems to us that, although much can be learned from statistics, the observations by unbiased workers on the reactions and rehabilitation of the individual cases is of tremendous importance. We have seen many cases make almost dramatic improvement, whose previous appearance and reactions indicated a gradually developing deterioration extending over a period of months and even

years. The most gratifying remark we have heard from relatives of patients has been "Doctor, I had given up hope. I never expected to see her this well again." This has been heard many times since the Metrazol treatment was begun. While there may be some doubt as to the completeness or the permanence of the recovery of these patients, we are convinced that the treatment is beneficial in many cases.

Summary

1. Metrazol therapy is not a panacea for all mental ills, but it is a distinct adjunct to psychiatric therapy. Its greatest field of usefulness seems to be in stuporous, inaccessible catatonics.

2. In selected cases of schizophrenia remissions may be expected in 65 to 70 per cent, as compared with 40 per cent in untreated cases. If improvement is going to occur it usually begins after a relatively few convulsions.

3. In chronic and apparently deteriorated cases substantial improvement frequently occurs, and subsequent hospitalization is made less difficult and expensive.

4. The period of hospitalization seems to be definitely shortened.

THE DIAGNOSIS AND TREATMENT OF THE ANEMIAS

ROBERT P. MOREHEAD, M.D.

An anemia occurs when the hemoglobin of the blood falls below the normal limit. Since the entire amount of hemoglobin in the body is contained in the red blood cells, an intelligent understanding of their metamorphosis is prerequisite to a proper understanding of hemoglobin metabolism and the etiology and pathogenesis of the anemias.

Red blood cells are derived from the sinusoidal endothelium of the bone marrow, erythropoiesis being an intravascular phenomon.[1] From the sinusoidal endothelium comes the megaloblast, the most primitive of the erythrocytes. The megaloblast is an unusual cell in that it requires for maturation those substances essential for the growth of most cells, plus an anti-anemic principle. The anti-anemic principle is formed by the interaction of an extrinsic factor from the food with an intrinsic factor from the gastric and duodenal glands. After formation, it is absorbed by the stomach and intestine and is stored in the liver and, to a lesser degree, in other organs.

The intrinsic and extrinsic factors have not been identified chemically but the former is probably enzymic in nature[2], while the latter is closely associated with protein[3]. Little is known about the anti-anemic factor which is stored in the liver except that it is essential for the maturation of erythrocytes from the megaloblastic stage.

When there is a deficiency in the anti-anemic factor, the bone marrow undergoes an erythroblastic type of hyperplasia, the degree of hyperplasia being in direct proportion to the number of circulating erythrocytes[4]. The hyperplasia is confined to the young or megaloblastic erythrocytes, and maturation does not take place. The primitive red blood cells die *in situ*, hemoglobin is set free, iron is split off, and bile pigment formed. This results in an increase in the serum bilirubin of the blood. This, along with the profound anemia, accounts for the lemon yellow color commonly seen in pernicious anemia. Those cells that do undergo complete maturation have an increased amount of hemoglobin to transport, since iron is present in normal amount. In order to cope with this situation, the concentration of hemoglobin becomes greater in each cell (the cell becoming hyperchromic) and there is an increase in the size of cells (cells becoming macrocytic). The color and volume indexes are obviously increased. The resulting anemia is a hyperchromic macrocytic anemia.

A hyperchromic macrocytic anemia may result from: (1) a deficiency in the intrinsic factor—e. g., atrophy of the gastric mucosa in pernicious anemia, gastrectomy, infiltrating carcinoma, etc.; (2) a deficiency in the extrinsic factor—e. g., sprue; (3) failure of the intestine to absorb the anti-anemic principal—e. g., ileitis, intestinal stricture, gastro-colic fistulae; or (4) failure on the part of the liver to store the anti-anemic factor

From the Department of Pathology, School of Medical Sciences, Wake Forest College. Read before the First General Session of the Medical Society of the State of North Carolina, Bermuda Cruise, May 10, 1939.

1. Maximow, A.: A Textbook of Histology, Philadelphia, W. B. Saunders Co., 1934.

2. Wilkarson, J. F., and Klein, L.: Relationship Between Anti-Anemic Principle and Liver, Lancet 2:629, 1933.

3. Castle, W. B., and Minot, G. R.: A Pathological Physiological and Clinical Description of the Anemias, New York, Oxford Press, 1936.

4. Dameskek, W.: Biopsy of Sternal Bone Marrow: Its Value in Study of Diseases of Blood Forming Organs, Am. J. M. Sc. 185: 617, 1933.

—e. g., the late stages of portal cirrhosis, toxemias of pregnancy, etc.

One may readily see that there are many hyperchromic macrocytic anemias, but the most important of these is pernicious or Addisonian anemia. The etiological factor in this disease is in all probability a deficiency in the intrinsic factor resulting from atrophy of the gastric mucosa. Other products of gastric secretion suffer also, particularly hydrochloric acid, and a diagnosis of pernicious anemia in its presence is likely to be erroneous. The symptoms are those of anemia and gastro-intestinal disturbances. To these may be added the all important changes in the nervous system. In Herman's series, 72.5 per cent had spinal cord involvement (postero-lateral sclerosis), and 15.7 per cent showed mental changes[5]. The neurological lesions are probably the result of anoxemia of the nervous tissue along with a deficiency in some substance necessary for the health of nerve cells. Since this is a true hyperchromic macrocytic anemia, the laboratory findings are those which were discussed in preceding paragraphs.

The treatment of macrocytic anemias resolves itself into supplying the existing deficiency. If the deficiency is in the extrinsic factor—e. g., sprue—therapy will consist in supplying a diet rich in protein (beef contains large amounts of the extrinsic factor). If the deficiency is the result of failure of the gastric mucosa to elaborate the intrinsic factor, or faulty absorption of the anti-anemic factor by the intestine, or its storage by the liver, the treatment will consist of an attempt to correct the underlying condition, in addition to supplying the deficiency.

From a study of the pathological physiology of this condition, it is obvious that the therapeutic agents are stomach and liver. The latter is the more commonly used and effective agent in macrocytic anemias, but cases are seen which are refractive to liver and respond promptly to ventriculin (dessicated hog stomach). The dose of liver, like any other remedial agent, is that amount which will produce the desired therapeutic effect. Attempts to test the liver principle have been unsuccessful, and the substance must be assayed biologically. The only satisfactory subject thus far has been the untreated pernicious patient showing a red blood cell count of three million or less. The form in which the factor is given matters little; but the extracts for intramuscular injection are more convenient in that the dose is given at rather infrequent intervals. Adequate treatment is of paramount importance, and the criteria for adequacy include elevations of erythrocyte and hemoglobin values to normal levels and maintenance of the normal size of the erythrocytes. Reticuloyte counts should be performed daily until a satisfactory response has been obtained. The color index should be determined weekly, and, if it should fall below the normal level, supplementary iron therapy instituted.

The second great group of anemias are the hypochromic anemias. These are the anemias in which there is a deficiency in hemoglobin. The hypochromic anemias are usually a symptom of some other disease, and they constitute 95 per cent of all of the anemias. They may be defined as a state of the blood in which the loss of hemoglobin has exceeded the loss of erythrocytes. If the blood loss is acute—e. g., acute hemorrhage, the resulting anemia will be hypochromic and normocytic. On the other hand, if the anemia becomes chronic cells of normal size (normocytes) are no longer needed to carry the hemoglobin and they become smaller than normal (microcytes). The resulting anemia will be hypochromic and microcytic. The anemias of accelerated blood destruction—(e. g., familial hemolytic icterus, infections, and poisons); and depression of marrow function (e. g., idiopathic aplastic anemia, cachexia, and malignant infiltration, etc.,) will also produce a hypochromic and microcytic type of anemia.

Since hypochromic anemias are the result of a deficiency in hemoglobin, iron is obviously the remedial agent. In spite of the tremendous amount of work done, there is no agreement regarding the minimum amount of dietary iron required by a healthy adult. We do know however that "for optimum regeneration of hemoglobin in patients with anemia, much greater amounts of medicinal iron are required than are necessary for the synthesis of hemoglobin."[6] It appears that an excess is needed because of inefficient absorption or because after absorption only a portion of the metal is put into physiologic use. There appears to be no correlation be-

5. Herman, M., Most, H., and Jalliffe, N.: Phychoses Associated with Pernicious Anemia., Arch, Neurol, and Physhiat. 38: 348 (Aug.) 1937.

6. Fowler, W. M., and Barer, A. P.: Retention and Utilization of Orally Administered Iron, Arch. Int. Med. 59: 561 (April) 1937.

tween the retention and utilization for new hemoglobin of orally administered iron[6]. We give all patients suffering from hypochromic anemias 100 grains of iron and ammonium sulphate daily until the maximum hemoglobin content is obtained.

Liver and copper have no place in the treatment of hypochromic anemias. The addition of copper leads to diminished retention of iron, but also to slightly increased utilization. The addition of liver is followed by slightly decreased iron retention.

Commercial liver preparations, apart from their iron content, are wholly ineffective in the treatment of hypochromic anemias.

It is a well known fact that the peripheral blood does not always reflect accurately the condition of the hematopoietic system. The blood picture is the result of many complex factors which are concerned with the growth, destruction, and liberation of the various elements of the blood. Diseases of the hematopoietic system may therefore occur without changes in the peripheral blood, and likewise diseases not primarily concerned with hematopoiesis may produce changes that suggest disease of the blood-forming organs. From these considerations it becomes evident that in some cases it would be desirable to study the organs of blood formation during life in conjunction with studies of the peripheral blood. By correlation of the two an accurate diagnosis can usually be made and an intelligent therapeutic campaign instituted.

A method which has been found superior to the sternal puncture method, and which in our hands has been followed by no complications, is as follows:[7]

"Using rigid aseptic technique, the skin and subcutaneous tissue are infiltrated with a 2 per cent solution of procaine hydrochloride for 2 cm. on either side of the midline and for a distance of 3 cm. below and above the level of the fourth rib. A short incision is then made in the midline down to but not through the periosteum. A small needle is introduced between the bone and periosteum and a small bleb produced. The subperiosteal space is then infiltrated over an area of about 2 cm. A small incision is then made in the periosteum and both sides elevated. The spike of a 1 cm. trephine is introduced through the ventral table of the sternum and a shallow groove produced by a gentle rotary movement of the trephine. The instrument is withdrawn, the spike removed (this is a precaution against entering the mediastinum), the trephine reinserted and the cortex penetrated; the patient experiences a slight sensation of pressure as the marrow cavity is entered. The trephine is gently rocked to break up the trabeculae and the button of bone removed and placed immediately in nine parts of the following solution to which one part 10 per cent formalin has been added immediately before use:

"Potassium bichromate	2.5 gm.
Mercuric chloride	.5 gm.
Distilled water	100 cc.

"A few small fragments of marrow are then removed, with a sharp spoon curette, and handed to an assistant who places several in the fixing solution, the remainder being used for smears. The latter are prepared by gently grasping the fragment with fine forceps and pulling it evenly over clean slides. As the smear dries it is immersed in pure methyl alcohol for ten seconds. In the meantime the surgeon packs the marrow cavity with gauze until bleeding stops. The periosteum is then allowed to cover the wound and the skin is closed with No. 00 plain catgut." The material is immediately sent to the pathologist for microscopic study.

Conclusion

In order to study an anemia properly one must first determine the size and hemoglobin content of the cells as compared with the normal. This is done by estimating the color and volume indexes. It is also of advantage to know whether the anemia is the result of increased blood destruction or decreased blood formation. The icterus index, along with the reticulocyte count, affords this information, since the former is the most reliable index of peripheral blood destruction, and the latter of blood formation. If the peripheral blood does not give enough information we believe that the physician is then justified in trephining the sternum.

During the past ten years, much progress has been made in the diagnosis and treatment of the anemias. The treatment of an anemia today is as specific as the treatment of an infectious disease. Through a little additional effort on the part of the physician, the patient will reap much benefit from the modern march of hematology.

7. Morehead, R. P.: Biopsy of The Sternal Bone Marrow, South. Med. and Surg. 99: 555 (Nov.) 1937.

THE MENTAL HYGIENE OF CHILDHOOD IN THE PUBLIC HEALTH PROGRAM

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The Points in Common in Physical and Mental Hygiene

The fields of physical and mental hygiene overlap, and the special workers in public health and those in mental hygiene have a great deal in common. Both sets of workers are grounded in medicine, but are socially minded and frankly view their activities as related to those of social agencies. Both are interested in environments as well as in persons.

The mainsprings of both the physical and the mental health programs are derived from a common social attitude and humanitarianism. Both the mental hygienists and the public health workers consider their affairs community affairs. Much of the work and organization in psychiatry and mental hygiene, as well as in public health, are carried on as governmental responsibilities and functions. The public health worker is called upon to do all that medical work in a community which is left undone by the private practice of medicine. At the present time in most communities the work in mental hygiene is left undone; so the public health worker is commissioned to assume this responsibility. Among the responsibilities of a public health worker are not only the preservation and promotion of both physical *and mental* health, but often the actual care and management, at least in emergency, of mental and nervous patients.

It is no wonder that from both theoretical and practical considerations public health has often considered incorporating mental hygiene in its program, and sometimes has even done so. With such dread communicable diseases as typhoid, diphtheria, smallpox, etc., under control, public health may be looking around for new fields to conquer. If one accepts Winslow's definition of public health as "the art and science of preventing disease, prolonging life and promoting physical *and mental* efficiency through organized community effort," then public health has already assumed a responsibility for mental hygiene. Certainly, there should be a close relationship between the two.

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The Points of Difference

But it is necessary to remember the points of difference between physical and mental hygiene as well as the points in common. Mental hygiene is a vast, difficult and uncrystallized subject which has its own concepts and techniques. Psychiatry and mental hygiene diverge both from medicine and from public health in going beyond physical and chemical and physiological factors into imponderable psychological ones which demand a different point of view and a shift in approach. Factors in mental, nervous and emotional disorders are not only mixed by being partly "physical" and partly "mental", but are also apt to be multiple, complex and variable. Each patient has to be individualized. Mental factors do not lend themselves to the mass approach and to the mass action that is customary in most public health work. It is a well-known fact of public health practice that preventive measures can be applied best where the factors are simple and specific and where causal relations are best understood. One cannot line up children and inject them with mental hygiene as with diphtheria toxoid, for example; or vaccinate them aganst mental and nervous breakdowns. But, borrowing a figure of speech from public health, children can be immunized against some harmful situations as well as against some physical diseases. It follows that there will always need to be special workers in public health and special ones in mental hygiene. Sometimes their activities will be in common, sometimes they will overlap, and sometimes they will be divergent. It seems not only very desirable but very necessary that the two sets of workers understand each other and their respective fields and activities.

The physical and mental hygiene of infancy and childhood especially overlap—indeed, are inseparable. In order to limit a large subject, this discussion is going to concentrate upon the mental hygiene of childhood in the public health program.

The Incidental Benefits to Mental Health of Certain Public Health Procedures

So close is the association and so great is the interaction of body and mind that any-

thing that promotes physical health at the same time promotes mental health, and vice versa. It is difficult sometimes to say where physical hygiene leaves off and mental hygiene begins. The ancient ideal of a sound mind in a sound body still holds, and should still be sought.

Some of the public health activities and interests that have incidentally increased mental health, especially those that have had a bearing on the mental hygiene of infants and children, might be mentioned. All of the public health activities that improve the environment—such as slum clearance, better housing, better food and water supplies and inspections, and better sewerage disposal—have vastly promoted mental as well as physical health and happiness. The public health control of communicable diseases has not only prevented death, but has conserved mental and physical health, especially of children. The control of the diarrheal diseases of infants without a doubt has benefited the mental as well as the physical health of the infant and the child There are many specific diseases in which the infective agent has a special predilection for the brain. Any decrease in the incidence of these disorders that public health and modern medicine have been able to bring about must certainly be considered a great contribution to mental hygiene.

Venereal infections in general and syphilitic infections in particular are great ravagers and destroyers not only of the nervous system, but also, directly and indirectly, of the mind; so that mental hygiene considers venereal disease control part of its program, as does public health. Quoting Smillie: "The most concrete results in prevention of any type of mental disease have been secured through prevention of syphilis, or more productive still, through adequate treatment of early syphilis." It is heartening to those interested in the mental hygiene of infants and children to see the legislation in North Carolina requiring serological tests of expectant mothers, and the increased activities in the diagnosis and treatment of congenital syphilis.

Nutritional deficiencies cause mental and nervous diseases. The outstanding example of this is pellagra. Mental hygiene will reap benefits from the public health work and education along these lines.

Numerous cases of intra-uterine or prenatal maldevelopments are encountered among infants and children in neurology and psychiatry. Theoretically, and probably practically, the number of these will be diminished by the increased attention public health is giving to maternal welfare. Some neuropsychiatrists see in birth injuries one of the greatest sources of serious neuropsychiatric conditions, and great hope rests in the better obstetrical care that public health is striving to bring about.

Mental Hygiene Principles of Infancy and Childhood

Only a few of the principles of mental hygiene for the infant, the pre-school child and the school child can be indicated here. Those who are interested can be referred to the sixth edition of Rosenau's text-book of PREVENTIVE MEDICINE AND HYGIENE, in which can be found a very excellent chapter on mental hygiene by A. Myerson.

The physical and the mental hygiene of the infant are one and the same. The infant needs a calm environment, a lack of overstimulation, and a chance to feed and to rest properly and to grow and develop normally. In infancy mental and physical habits are very closely associated. Good habits can be encouraged and established and, at the same time, poor ones can be avoided. One cannot distinguish those habits which belong to physical hygiene from those which are a part of mental hygiene. The baby does not need two different kinds of hygienists; rather, it needs one who is proficient in the combined physical-mental hygiene of infancy.

It is different when we come to the child. Here there is a rapid growth of that which we are accustomed to call "mind" or "behavior". Mental and emotional problems can be distinguished from physical ones. Childhood is the golden period of mental hygiene. As the twig is bent, so grows the tree. When one considers that our present psychological theories are to the effect that mental and emotional attitudes and habits, which form the very foundation and basis of the personality, are laid down in childhood, it is no wonder that the mental hygienist is tremendously interested in children and desires to start to function as a specialist in the period of childhood.

The pre-school child period extends from

the time that the habits of walking, talking and elimination are fully established until the time the child goes to school regularly. It is a comparatively short period, from about the age of three until five or six, but it is a very important one from the standpoint of both physical and of mental hygiene. Physically, the diseases and injuries, perils to growth and development, that beset a young child are encountered. Mentally and emotionally, the child has to absorb in some measure the culture that the race has taken thousands of years to accumulate. The child at this period obtains mental and emotional habits and attitudes that are apt to be lifelong. During this period the child should be immunized not only against certain diseases, but also against certain experiences.

When one considers all the child has to learn, one should be tolerant and patient. The greatest lessons he has to learn are those of socialization—to adjust and to get along with other people, and also to benefit from experience. It must be remembered that play is more than recreation for the child; it is experience. The child should be taught endurance and fortitude. Discipline, to be of the right sort, has to be individualized for each child, taking into consideration his physical and temperamental makeup. Too-harsh discipline should be avoided. It may make for a crushed passivity, or for rebellion. Probably a greater peril is too little discipline, or spoiling. There has been a misinterpretation of the so-called new child psychology, in the idea that the child should express himself unhampered and unpunished. Nothing would be worse mental hygiene. Such a child would not be free, but a victim of his own whims and impulses. There would surely be continuous clashes at school and in society with the necessary conventions and perhaps later with laws.

Since there are not enough psychiatrists and mental hygienists to go around, and since the parts played by parents and the schools in the broad education of the child and in the inculcation of mental hygiene principles always need supplementing, public social and health workers have a part to play. They can make physically and mentally sanitary the environments of the home and the school. They can provide the proper facilities and setting for play. With some training in mental hygiene, public health workers can aid parents in adjusting the home life of the child to correct unhealthy habits and tendencies that might lead to serious future difficulties. This training would enable public health workers to make mental hygiene an integral part of the general public health program. At the same time, it would teach the public health workers to recognize their limitations and to elicit the aid of specialists in difficult and complex problems.

There are certain conditions that are public health problems because of their great prevalence and because the private practice of medicine unaided and without some community efforts cannot adequately cope with them. Among these are some well-known and frequent neuropsychiatric conditions. Because of their prevalence and because they demand organized efforts, mental and nervous diseases are sometimes spoken of as among the greatest of public health problems. In this country there are nearly half a million hospital beds devoted to mental and nervous diseases — more than to all other kinds of diseases combined—and each year about 100,000 new cases enter mental hospitals. With good mental hygiene, especially if it is begun in childhood, many of these mental disorders can be prevented, and with good psychiatric practices many can be modified or cured.

It has been estimated that from 2 to 4 per cent of the population are to some degree mentally or intellectually deficient, as opposed to mentally diseased. These defectives are often serious social problems.

It has also been variously estimated that from .2 to 2 per cent of the population are epileptic. Some authorities maintain that as high as four per cent of the population have a tendency to be convulsive. Most cases of epilepsy start in childhood, and this is the period in which an attempt to control the condition by adequate social and medical measures should be instituted. To do so properly will tax the combined resources and facilities of those concerned with public health and those who are interested in mental hygiene.

While there are sufficient psychiatric cases among children so that a whole new specialty of child psychiatry has been established, and while the problems in mental hygiene of children are numerous and diverse, there are few cases of major mental disorders or

major psychoses. Dementia praecox and the manic-depressive psychoses represent the two greatest major psychoses. These develop so rarely before the age of fourteen that one should hesitate to make these diagnoses in children. It seems very desirable to be able to recognize the children who are predisposed to these disorders, but there are certain great and almost insuperable difficulties in doing this. Psychiatrists and mental hygienists have a fairly good idea as to the types of personality in which these disorders may develop, and so they are able to recognize the predisposition of some children to certain psychoses. However, those who have not had special training can not be taught to do so without some danger both of missing many conditions and of considering many children as pre-psychotic who are not.

Annually thirty to forty thousand new patients develop dementia praecox, and altogether nearly one-half of the beds devoted to mental diseases in this country are occupied by sufferers from this disorder. This makes dementia praecox a greater health problem than tuberculosis. In children one encounters pre-dementia praecox rather than fully developed cases. As in tuberculosis, early diagnosis seems very desirable, for it is in the early cases that most can be done.

The problems in child psychiatry, other than those of mental deficiency and epilepsy and the major psychoses which have been mentioned, are so numerous and diverse that it is difficult to classify them. A group of problems in emotionalism and in neuroticism in children, somewhat related to the problems of the psychoneuroses in adults, is encountered. There is a large and distinctive group of problems known as the primary behavior disorders and conduct disturbances that both the mental hygienists and the public health workers see. They should be familiar with them and prepared to manage them.

Relationships of Public Health and Mental Hygiene

The State has the main responsibility in the care of the mentally ill and the mentally deficient, and in a general mental hygiene program. This should be centralized in a State Department of Mental Hygiene with a Commissioner of Mental Hygiene, just as there is a State Department of Health with a Commissioner. These two State officers and these two State departments should work in collaboration. The State Department of Mental Hygiene and the State Commissioner should have oversight and direction of all the activities and endeavors along the lines of mental hygiene. The State should maintain medically and psychiatrically adequate State hospitals. Some special provisions somewhere in the State set-up should be made for child psychiatry. In modern psychiatry the psychopathic hospitals that concentrate on early and recoverable mental conditions rather than on custodial care play a great and important role. Since most psychiatric conditions in children are acute and recoverable, probably the special provisions for children should preferably be in the acute psychopathic rather than in the State hospitals. This would also tend to increase the very desirable segregation of children from adult and chronic patients.

In the local communities, counties, and municipalities, unless they are very large and wealthy, it does not seem feasible to have resident psychiatric and mental hygiene officers and workers such as the public health program has. Even separate divisions of mental hygiene in the local public health organization are not advised. Local needs can be fairly well supplied by traveling psychiatric and mental hygiene clinics under the direction of the State Commissioner of Mental Hygiene and the State hospital system. This is the system in effect in the most progressive and well-organized states. It still leaves the public health workers, officers and nurses and the private practitioners as the first line of resident defense in public mental hygiene and psychiatric practices, and makes it imperative for all the health workers to have some understanding of mental and nervous disorders and to be "mental hygiene minded", especially in regard to infants and children.

Local health officers and nurses who are alive to the needs of their community will find that the whole broad field of mental hygiene touches—in fact, invades their more specific activities and functions at every point. The local health workers should be familiar with mental diagnoses and with the care of mental diseases and deficiencies. They should know how to go about obtaining specialized help if this is necessary, and how to cooperate with visiting clinics, and

they should know something about the mental hygiene facilities such as homes, specialized schools, hospitals, colonies, and institutions, both public and private charitable ones.

A modern State hospital system has provisions for some sort of parole or probate for discharged and convalescent patients. Sometimes the readjustment of the mental patient from the sheltered hospital conditions to the home situation, and the gradual assumption of the burdens of life may cause relapse. Through the psychiatric social workers the hospitals should give some intermittent help and guidance, but the local health workers should supplement this with more continuous local assistance.

Some states provide for visiting local mental hygiene clinics for children — or child guidance clinics, as they are called—in addition to those for adults. These child guidance clinics are excellent and are in line with the most advanced mental hygiene procedures; however, they consume a great deal of professional time and were it not for their value in research in child psychology, they are so expensive that they would have to be classed as medical and social luxuries. At present only large and wealthy communities or well-endowed organizations maintain these separate child guidance clinics. They cannot function effectively without the cooperation of other welfare and health agencies on whom they rely, not only in obtaining and arranging for their cases, but also in carrying out their recommendations.

The school system and the public health department should cooperate in a community in medical inspection in the schools, and some work in mental hygiene should be incorporated. The medical inspector of the school system should be prepared to aid in the recognition and the handling of children who are experiencing mental and emotional handicaps and difficulties. Health aid should even extend to the recognition of cases of mental deficiency and to the establishment of the special classes which have been found so beneficial for problem children.

Many times someone is needed to give a psychiatric opinion about a delinquent child. This happens especially when a juvenile court is functioning in a modern and progressive way and wants to take into consideration all the factors in its deliberation about a case. If there is no specialized help available, the public health officer should be prepared and willing to render these services. Similar help is also often needed in problems concerning the adoption of children

Wilson G. Smillie, a great authority on public health, in his book on PUBLIC HEALTH ADMINISTRATION emphasizes the importance of mental hygiene in the public health program in general and the importance of the public health nurse in the mental hygiene work in the local communities in particular. Quoting Smillie, "Public health workers, especially public health nurses, should be trained to understand people as well as disease, and to deal with common mental hygiene problems as a part of their daily activities in their contacts with the community."

In both public health and mental hygiene great reliance is placed on the education of the public and both endeavors have already reaped advantages from their educational work, notably public health. But mental hygiene has also succeeded in dispelling some of the ignorance and has changed some of the attitudes concerning mental and nervous diseases. In this educational work the programs of the health worker and the mental hygiene worker can reinforce each other.

There is little doubt that the teachings of mental hygiene have already been widely diffused to the advantage of human health, happiness and efficiency. Attitudes toward children, their rearing, their training, and their education have been revolutionized in the last generation. Psychiatry and mental hygiene have thrown a great deal of light on the sexual life of normal and abnormal persons. Unless the programs for sex hygiene and education utilize these findings and proceed along psycho-sexual lines, they will get nowhere. The child is not without sexual curiosity. A young child's questions as to sex should be met frankly and openly. No covered and morbid curiosity should be allowed to develop. No information beyond a young child's understanding or beyond a simple, honest answer to his questions should be given. No great or complicated amount of sexual instruction is usually needed in what is known as the latency period, from the age of five or six until around eleven (and any is best given to the individual child rather than to any group of children). After that the child should be gradually, calmly,

prepared for the stress and strain of puberty and adolescence by appropriate instruction as to sex.

Just as there are voluntary associations such as the Red Cross, tuberculosis associations, etc., that are auxiliary to public health work, so are there organizations to promote mental hygiene, such as state and local mental hygiene societies, which play a definite and valuable part in the community mental hygiene program. Mental hygiene societies study the cause, prevalence and prevention of mental disorders, stimulate interest in them and help educate the public as to them and, in general, serve as a clearing house for information about them. If they at all warrant it, these mental hygiene societies should have the approval and the support of the public health workers.

Mention has been made of specific control of one group of mental diseases, those caused by syphilis of the nervous system. There seems to be another specific preventive for some mental disorders, but it is one that presents all sorts of difficulties, not the least of which is our inadequate knowledge of it. This is the application of eugenics. While this question is one in which both public health and mental hygiene are greatly interested, it differs from the practices of each in that it is directed more toward those unborn than toward those born; and it is such a complicated and controversial subject that it cannot be dealt with here. There is great need both for more scientific knowledge and for more education of the public before we are in a position to apply effectively the principles of eugenics.

It is possible that except in the case of hereditary and syphilitic and other infectious diseases, we shall never see specific causes and specific treatment and cures for many of the mental, nervous and emotional disorders, and any search or research for them is like chasing a will-of-the-wisp. In psychogenic or mentally determined mental diseases, we shall always have to depend on the difficult diffusion of mental hygiene teachings and principles and on the influence of individual practitioners and mental hygienists.

In spite of these difficulties and these differences, there should nevertheless be a better understanding and collaboration between the program of public health and that of mental hygiene.

THE NEWER KNOWLEDGE OF VITAMINS

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A deficiency disease, of whatever nature, causes distinctive functional disturbances which have their origin in morphologic changes in certain tissues. These are regarded as primary effects. Various nonspecific and secondary effects necessarily follow.

Vitamins A, D, and E are soluble in fats and are associated with lipoid extracts of natural products. Vitamins B, C, riboflavin, and the antipellagra factor or factors, and certain others are soluble in water. There is at least one fat soluble factor not listed above, and several water soluble factors known to be indispensible for the rat or the chick which are not, apparently, essential for man.

Vitamin A

Vitamin A does not occur in the plant world, but its precursors, carotene and cryptoxanthin are widely distributed. Carotene is one of the yellow pigments found in yellow and green plants and was so named because it was first isolated from carrots. It occurs in three forms, A, B, and Y-carotene, B-carotene has double the vitamin value of the other forms. The precursors carotene are also found in fish liver oils, milk, butter, eggs and liver in varying proportions.

Vitamin A values are essential to the growth of the young and to nutrition and health at all ages. When the intake is in excess of immediate need the body stores the surplus, so that a subsequent temporary deficiency of intake may show no effect.

Dr. McCollum states that the pathological condition of vitamin A deficiency, or A-avitaminosis, is the result of accumulation of keratinized epithelial cells in glands and their ducts, and in many organs. Wolbach[1] has discussed the subject in detail. In the lungs, cyst formation and bronchial occlusion, with consequent bronchiectasis and atelectasis, have been observed in men and animals. In organs cysts are formed which are filled with a yellow cheesy mass of des-

From the Woman's College of the University of North Carolina. Read before the North Carolina Public Health Association, Greensboro, May 1, 1939.

1. Wolbach, Science, 86:569; J. A. M. A. 81:828, 1937.

quamated keratinized cells. Higgins[2] found that urinary calculi occurred in 50 per cent of animals deficient in vitamin A, and he points out that keratinization of the epithelium of the genito-urinary tract, urinary infection, and alkalinuria are due to ammonia formation. On administration of vitamin A, the epithelial cells return to their normal form and function, the infection clears up, and the urine becomes acid.

O'Conor[3] has pointed out the frequent occurrence of calcium carbonate calculi in patients on an alkaline diet in the treatment of ulcer, and states that the provision of abundant vitamin A is generally effective in preventing recurrence of these stones.

During the last few years several clinical investigations have been published on the skin lesions which, according to some observers, are the earliest evidences of vitamin A deficiency. Frazier and Hu[4] first pointed out that in this deficiency keratotic papules of varying size appear, distributed especially over the thighs, arms and shoulders, and arising from the pilosebaceous follicles. Microscopically, the ducts are distended, and the openings are plugged with desquamated cornified epithelium. This eruption is rare in children, but rather common in adults, and when fully developed probably represents late or severe deficiency. Dryness of the skin, according to these workers, preceded the eye changes by several weeks.

At the present particular interest centers upon vitamin A deficiency in relation to impairment of vision. It is believed that both in adults and in older children hemeralopia is one of the earliest manifestations of vitamin A deficiency. In general xerophthalmia and night blindness are present when the deficiency is of longer duration. Infection of the cornea is favored by the accumulation of keratinized cells and by lack of tears for washing the eye, and may lead to ulceration of the cornea. Night blindness is failure of vision in faint illumination. These patients respond well to administration of vitamin A.[5]

The exact daily requirement of vitamin A has not been determined. Just as different foodstuffs vary in the amount of the vitamin they contain, so individuals may vary in their ability to absorb, store, convert, and destroy carotene and vitamin A. A number of estimates of daily human requirements for this factor are available.

In the diets of nursery school children Rose, Robb, and Borgeson,[6] found the daily supply of vitamin A at school as follows:

	Measure	*Units of Vitamin A*
Milk	1 pt.	1,000
Cod Liver Oil	1 tsp.	2,000
Butter	1 tsp.	100
Egg Yolk	1 yolk	825
One Vegetable rich in Vitamin A	2 tbsp. carrots	1,000
		4,925

If the home diet includes another pint of milk, another teaspoon of butter and another vegetable rich in vitamin A daily, the diet of a nursery school child would contain 6,000 to 7,000 units of vitamin A per day. Stiebeling (1936) states that the daily requirement of adults is from 4200-5600 International Units. Growing children are allowed double the amount. The Committee of Nutrition of the League of Nations (1936) suggests a daily intake of 8700 International Units for pregnant and nursing women. Vitamin A taken in large amounts is not toxic.

Vitamin B

The principal effects of vitamin B or thiamin deficiency are degeneration of the nervous system, cardiac enlargement and dysfunction, edema, gastro-intestinal disturbances, muscular atrophy, and loss of appetite.

Some of the nervous symptoms of thiamin deficiency are numbness and tingling sensations, particularly affecting the fingers and usually associated with a gnawing pain which runs up the arm, especially at night.

Cowgill[7] pointed out that conditions such as amebic dysentery, commonly found in beri-beri localities, may constitute the precipitating cause of the deficiency disease. The inefficient utilization of thiamin due to loss in watery stools and to gastro-intestinal disturbances which interfere with the digestion and absorption of nutrients may be the cause. Strauss[8] has shown that this interference with absorption of thiamin is most frequently the cause of dietary deficiency diseases, particularly pernicious anemia and related macrocytic and idiopathic hypochromic anemias, pellagra and "alcoholic"

2. Higgins, C. C., J. A. M. A. 104:1296, 1935.
3. O'Conor, V. J., J. A. M. A. 104:1298, 1935.
4. Frazier, B. N. and Hu, C. K., British M. J. 2:113, 1934.
5. Jeans, P. C. and Zentmire, Z., J. A. M. A. 106:996, 1936; ibid, 108:451, 1937.
6. Rose, M. S.: The Foundation of Nutrition, 1938.
7. Cowgill: The Vitamin B Requirement of Man, 1934.
8. Strauss, M. B., J. A. M. A. 103:1, 1934.

pregnancy, and other forms of polyneuritis in the temperate regions.

Minot[9] has reported cases of diabetes associated with peripheral neuritis and achylia gastrica which responded to yeast therapy, and has raised the question whether achylia gastrica may not interfere with the utilization of both the anti-beri-beri and anti-pellagra vitamins. Many cases are recorded of the appearance of B avitaminosis associated with voluntary restriction of the diet as a result of digestive disturbances, or for therapeutic measures, as in diabetes. Dr. Elsom[10] studied a patient who had voluntary restricted his diet, whose symptoms resembled those of pernicious anemia. There was marked pallor, glossitis, and signs of posteriolateral sclerosis. The typical signs of pernicious-anemia achlorhydria and anemia were lacking. There was edema and low blood protein. Administration of a liver preparation adequate to produce remission of pernicious anemia caused only slight improvement of the glossitis. On administration of a concentrate of "B-complex" there was rapid improvement in respect to fatigue, anorexia, dyspepsia, paresthesia, edema, glossitis, scaling of the forearms and brittleness of the nails. Improvement began in two weeks and was complete in six. The pitting edema disappeared, and there was a simultaneous rise in blood protein, although there was no increase in the protein content of the diet.

Loss of appetite is one of the first observable symptoms of thiamin inadequacy. Cowgill also noted loss of tone in the gastric musculature of thiamin-deficient dogs.

The more recent studies[11] have shown that thiamin deficiency is accompanied by a progressive diminution in carbohydrate tolerance. Peters' "theory"[12] is related specifically to pyruvate oxidase in its aerobic reaction. This specific action manifests itself in two ways: (a) by increasing oxygen intake and (b) by decreasing markedly the pyruvate formed by thiamin deficient brain tissue.

McCollum states that at least four important factors may operate in determining the amount of thiamin that should be in the diet in order to satisfy the body's need. They are: (1) the absorptive ability of the gastro-intestinal tract, (2) the degree of thyroid activity, (3) the amount and quality of the fat in the diet, and (4) the amount of riboflavin in the diet. The first has already been discussed; the second is briefly reviewed by Carpenter and Shrapless[13], whose studies suggest that some factor present in yeast, which is lost when the yeast is anto-claved and which is not supplied by a vitamin B-containing extract, causes an increase in the iodine content and concentration of the thyroid. Sure and Buchanan[14], have published results which show that in experimental hyperthyroidism protection can be afforded by ingestion of large amounts of pure thiamin.

The following are opinions (inadequately substantiated by facts) regarding thiamin needs. The Council on Pharmacy and Chemistry of the A. M. A. ('36) gives as the minimum requirement for infants 50 International Units, and for adults 200 International Units per day. Daniel and Munsell, ('37) give for adults 200-300 International Units per day; Rose, ('38) 400-500 International Units per day.

The successful therapeutic use of thiamin[15] has been reported in: Neuritis associated with pregnancy; heavy metal neuritis, such as lead, and arsenical neuritis occurring during intensive treatment for syphilis; trigeminal neuritis; certain so-called diabetic conditions; certain gastro-intestinal disorders; and lack of appetite.

Vitamin G

There is unanimity among investigators that pellagra is due to some dietary deficiency which has been called B_2, P-P factor, and vitamin G. For some years it was generally believed that a form of dermatitis in the rat caused by inadequate diet was analogous to human pellagra. This is now known to be a mistaken view. Maize, which has generally been abundant in the diet of the human pellagrin, prevents or cures the rat dermatitis. The factor necessary for the prevention of the rat dermatosis is now called vitamin B_6. The administration of liver, yeast, milk, lean meat, or wheat germ is curative in the human pellagra victims.

Recent developments have indicated that nicotinic acid may prove to be a valuable therapeutic agent in the treatment of pellagra. Elvehjem, Madden, Strong and Wol-

9. Minot, C. R., Ann. Int. Med. 3:216, 1929.
10. Elsom, K. O., Pennsylvania M. J. 37:87, 1933.
11. Stochr, Vitamin Forsch, 6:209, 1937.
12. Peters, Biochem. J. 30:2206, 1936.
13. Carpenter and Shrapless, J. Nutrition, 13:235, 1937.
14. Sure and Buchanan, Proc. Soc. Exper. Biol. and Med. 33:775; J. Nutrition 12:513, 1937.
15. Vorhaus, Am. J. Digest. Dis. and Nutrition, 3:915, 1937.

ley[16], have reported that nicotinic acid and nicotinic acid amide will cure black-tongue in dogs. Sebrell, Onstott, Fraser and Daft[17] have confirmed Elvehjem's results and find that 6 mg. of nicotinic acid twice a week will prevent black tongue in a dog on a black-tongue producing diet during an experimental period of six months.

A great number of research workers have administered nicotinic acid to pellagra cases. They noted rapid improvement in the mucous membrane lesions and in the erythematous skin lesions. They feel that nicotinic acid is either a pellagra-preventive vitamin or a provitamin, or that it is one of two or more substances necessary for the prevention of all the symptoms described as pellagra, or that it may be conjugated in the body into a more complex essential material.

Sebrell writes: "Diets on which pellagra develop are also deficient in other respects. Attempts to prevent the disease by the wide spread use of nicotinic acid might allow symptoms of vitamin B_1 deficiency, protein deficiency, riboflavin deficiency or mineral deficiency to replace pellagra as a nutritional problem in this country."

Therefore, although it may be desirable at some future time to attempt to prevent pellagra by the use of nicotinic acid mixed with some commonly used article of the Southern diet, the safest procedure at present is to continue vigorously our efforts to prevent disease by improving the diet, using nicotinic acid as individual circumstances indicate, and leaving the possibility of its uncontrolled administration until additional information is available.

Vitamin C

In humans a deficiency of ascorbic acid scarcely ever occurs unaccompanied by other dietary imbalance. This produces variability in the symptoms referable to scurvy, but in general the following are characteristic[18]: The adult loses weight, is anemic, weak, and short of breath. The gums become swollen, bleed easily and frequently ulcerate. The teeth loosen and may drop out. Necrotic areas in the jaw bones may occur. Hemorrhages in the mucous membranes and skin are characteristic. Blue-black spots develop in the skin after trivial injury, or they may occur spontaneously. The ankles become edematous, and in some cases there develops a hard, board-like condition of the skin and subcutaneous tissues. Nervous symptoms of various types may appear. Children and infants are fretful, anemic, and without appetite. They fail to grow satisfactorily, and exhibit vague evidences of illness.

Wolbach[19] states that "The characteristic hemorrhages of scurvy are attributable to the inability of the body to produce intercellular material. The latter is necessary to the walls of the blood capillaries. It is the cementing substance which holds these cells together. This intercellular material constitutes the foundation of all fibrous structures, the matrices of bone, dentine, cartilage, and all non-epithelial cement substances, including that of vascular endothelium."

The ability of human tissue to retain ascorbic acid depends in some measure on factors other than the amount of this substance already in the body. Hawley[20] and associates found that normal persons saturated with ascorbic acid excreted almost 100 per cent of daily test doses of pure vitamin C, when ammonium chloride was administered with it. However, the same dosage of vitamin, accompanied by sodium carbonate, was followed by an excretion of only approximately 50 per cent of ascorbic acid in the urine.

Better retention of ascorbic acid was obtained when cabbage was fed to guinea pigs.

Acetylsalicylic acid also caused increased excretion of ascorbic acid[21 22].

Chemical methods for assaying foods for ascorbic acid[23] have been made fairly reliable in recent years. The use of tests to estimate requirements for the vitamin, other than for the prevention of scurvy, are not sufficiently refined for universal acceptance.

An average man would require 40-60 units of vitamin C per day, or one-half cup of orange juice. A child needs about 80 Sherman units per day for safety[6].

Vitamin D

Studies of recent years have shown beyond a doubt that there are several chemically distinct forms of vitamin D. Of the several forms which have been recognized to date,

16. Elvehjem, Madden, Strong, and Wolley, J. Biol. Chem. 123:137, 1938.
17. Sebrell, W. H., J. A. M. A. 110:1665, 1938.
18. Dalldorf, G., J. A. M. A. 111:1376, 1938.
19. Wolbach, J. A. M. A. 108:7, 1937.
20. Hawley, J., Nutrition, 12:215, 1936.
21. Daniels and Everson, Proc. Soc. Exper. Biol. and Med. 35:20, 1936.
22. Bowman and Muntwyler, Proc. Soc. Exper. Biol. and Med. 35:557, 1937.
23. McCollum, E. V.: The Newer Knowledge of Nutrition, 1939.

two are known to be of prime importance in medicine. These are activated 7-dehydrocholesterol and activated ergosterol. Ergosterol is a sterol which occurs in relative abundance in fungi such as ergot or yeast. Activated by exposure to ultra-violet rays and dissolved in oil it is called viosterol. The Germans call it vitamin D_2. Activated 7-dehydro-cholesterol is cholesterol, the chief sterol of animal fats. Its active form thus comprises the vitamin D which is produced in the skin, fur or feathers of animals exposed to sunlight or other sources of ultraviolet rays.

Individual variation in ability to utilize calcium and phosphorus of the diet without added vitamin D exists at all age periods. Some infants have poor calcium retention, and only a very few retain an ample amount without vitamin D. As the age increases more persons are able to retain adequate amounts of these minerals without vitamin D, but at all age periods some persons are found who are not able to do so. Cod liver oil, U. S. P. Grade, contains 85 International Units of vitamin D and 600 units of vitamin A per gram. Halibut oil contains 75-125 times as much vitamin D as cod liver oil; tuna fish liver oil contains 40,000 International Units per gram.

The vitamin D requirement of a full term artificially fed baby is probably between 300 to 400 units a day. Normal babies receiving human milk require less vitamin D than babies receiving cow's milk. For children between infancy and adolescence a daily allowance of at least 750 cc. of milk with 300-400 units of vitamin D permits retention of calcium and phosphorus.

For adolescents a need for vitamin D exists, but insufficient data are available to permit an estimate of the quantity required. 300-400 units a day would be satisfactory[24]. For adults the optimum amount of vitamin D, if a need exists, remains to be determined. During pregnancy and lactation the requirement is greater than in any other period of life. A daily dosage of 800 units or more is suggested.

The only method available to determine the vitamin D content of an oil is based upon observing the size of the dose necessary for the deposition of calcium salts in the bones of growing rachitic animals[23]. It has been found that if a sample of cod liver oil and one of viosterol are assayed with young rats and then with rachitic chicks, about 100 times as many rat units of the vitamin of cod liver oil is necessary to produce comparable calcification in chick. This remarkable difference in the reaction of the rat and the bird affords a means of differentiating certain of the different forms of vitamin D. Rat unit for rat unit, the vitamin of tuna fish is only about one-seventh as potent for the chick as for the rat. Several careful investigations with human infants have demonstrated that the latter reacts almost equally well to the vitamin in cod liver and the viosterol.

May Mellenby first demonstrated the importance of an adequate supply of vitamin D for the development of teeth with normal structure of enamel and dentine. She also showed by extensive studies on institutional children that the regular provision of vitamin D reduces the susceptibility of teeth to decay. Several investigators have confirmed her findings. Since the normal behavior of cartilage and normal content of phosphate in the body fluids are essential for the calcification of enamel and dentine, and both depend upon an adequate supply of vitamin D, the soundness of this view is apparent. The presence of pits and fissures in teeth, forming potential food traps, predisposes teeth to caries. Since the ameoblasts are of epithelial origin, the significance of vitamin A, so necessary to prevent keratinization of this type of cell, is also apparent for the formation of normal enamel.

Richardson's study[25] on the effect of viosterol during pregnancy and upon the duration of labor in primiparae is of great interest. Of the 300 cases studied, 201 were given viosterol during pregnancy. The length of time of labor was reduced to almost one-half, and the loss of blood was less in women treated with viosterol.

Wilder and Howell[26] point out that the majority of cases of parathyroid enlargement occur in the northern part of the United States. Several investigators have described the extraordinary enlargement of parathyroids in chickens deprived of vitamin D. This condition is rare in the south, whereas it occurs frequently in the north.

24. Jeans, P. C., J. A. M. A. 111:703, 1938.
25. Richardson, G. C., Illinois Med. J. 65:367, 1934.
26. Wilder and Howell, J. A. M. A. 106:427, 1936.

VITAMIN CHART

Vitamin	Chief Functions	Results of Deficiency or Absence	Storage	Stability	Good Sources	Human Requirement
VITAMIN A $C_{20}H_{30}OH$ Exists as carotene and cryptoxanthin in plants and animals. These provitamins are converted into vitamin A in the body.	Essential for: Normal growth Normal function of eyes Normal function of epithelial tissues.	Drying and deterioration (keratinization) of sebaceous glands—skin dry, rough at hair follicles; a pimply eruption on back, chest, shoulders, thighs; acne on face. Tear glands cease to function, lids congested, cornea affected (xerophthalmia); sight less distinct in daylight (hemeralopia); night blindness. Mucous membranes deprived of normal secretion offer harbor for bacteria—cheesy deposits. Cyst formations and abscesses. Dentine and enamel of teeth become defective. Bones fragile; minute ridges at rib junction. Retarded growth and weakness. Interference with reproduction and lactation.	Surplus stored in liver, lungs and kidneys.	Not affected by heat alone. Gradual loss through long continued heating in contact with air.	Fish liver oils Liver Butter Cream Whole milk American cheese Escarole Chard Spinach Kale Dandelion greens Carrots Broccoli Asparagus String beans Yellow peaches Tomatoes	Exact daily requirement not known of any vitamin. Stiebeling ('36): Child, 8400 International Units. This may be supplied by: Milk, 1 qt. Cod liver oil, 2 tsp. Butter, 2 tsp. One egg 2 vegetables rich in vitamin A. Pregnant and nursing women, 8700 I. U. Adults 4000-5600 I. U.
VITAMIN B_1 $C_{12}H_{18}N_4SOCL_2$ Thiamin	Essential for growth; prevents neuritis. Promotes appetite and normal motility of the digestive tract. Important in carbohydrate metabolism, reproduction and lactation.	Beriberi. Degeneration of the nervous system. Cardiac enlargement and dysfunction. Edema. Gastro-intestinal disturbances. Muscular atrophy. Lack of appetite. Diminution of carbohydrate tolerance. Degenerative changes in testes and ovaries.	Not stored in the body.	Not destroyed at ordinary cooking temperatures.	Yeast, Liver, Wheat embryo, Milk, Peas, Soy beans, Spinach, Lettuce, Broccoli, Parsnips, Tomatoes, Plums, Oranges	Munsell ('39): 300-600 International Units. This may be supplied by: Milk, 1 qt. Whole grain cereals. Orange or tomato juice.
RIBOFLAVIN $C_{17}H_{20}N_4O_6$	Essential for growth.	Stunted growth; lowering of general tone; premature aging. Development of cataracts in rats and chickens. In dogs—weakness, lack of muscular coordination; livers hard, yellow and friable; bradycardia. Cheilosis (lesion on lips).	Stored in the liver, kidney, lungs and heart.	Stable to heat.	Yeast, Milk, Liver, Egg, Leafy vegetables, Veal, Pancreas, Beef muscle	Stiebeling ('36): Child, 450-540 Sherman-Bourquin Units. This may be supplied by: Milk, 1 qt. 1 egg, leafy vegetables.
VITAMIN G, or Goldberger's P-P factor, or Nicotinic acid $C_6H_5NO_2$	Necessary for the prevention of human pellagra and black-tongue in dog.	Pellagra-like symptoms Dermatitis Sore tongue, mouth and lips Gastro-intestinal disturbances Disorders of the nervous system.	Stored in the body.	Stable to heat.	Yeast, Milk, Liver and Extracts, Lean meats, Salmon, Tomatoes, Peanut meal	Not determined
VITAMIN C Ascorbic acid or Cevitamic acid $C_6H_8O_6$	Prevents scurvy. Essential to cellular respiration and to formation and regulation of intercellular material.	Inability of tissue to produce intercellular material. Profound changes in structure of teeth and gums. Changes in growing ends of bones with beading and other deformities. Falling apart of bones due to loss of supporting cartilage. Enlargement of heart and damage to heart muscle. Degeneration of muscle fibers; extreme weakness. Anemia due to destruction of blood forming cells in the bone marrow and loss of blood. Degeneration of bone matrix with loss of calcium.	Not stored in the body.	Heating, drying and aging are factors in destroying it. Addition of alkalis increases destruction.	Citrus fruits Tomatoes Cabbage Onions Strawberries Cauliflower Banana Pineapple Potatoes	Munsell ('39): 800-1200 International Units (40-60 mg.) (About four ounces orange juice per day or eight ounces tomato juice.) Pregnancy, twice the above needs. No injury from larger amounts.
VITAMIN D Two forms are important: Plant form—Activated ergosterol=Viosterol Animal form—Activated 7-dehydrocholesterol	Prevention and cure of rickets. Normal calcification in developing bone. Formation of normal teeth. Protection against dental caries. Required by pregnant mother to prevent rickets in the young.	Defect in calcification of growing bones. Soft and fragile bones. Enlargement of rib junctions "rachitic rosary". Enlargement of ends of long bones. Bulging forehead. Softening of cranial bones. Delayed closing of fontaneles. Malformation of chest and pelvis. Bowed legs. Defects in teeth (caries, poorly calcified teeth). General muscular weakness and instability of the nervous system.	Stored in the body.	Very stable.	Viosterol Cod liver oil Halibut oil Salmon Sardines Tuna fish Irradiated food Small amounts in milk and eggs	League of Nations ('36): Pregnant women, 340 International Units daily. Infants, 3 weeks, ½ tsp. cod liver oil or 400 I. U. per day; 2 months, 800 I. U. per day.
VITAMIN K Anti-hemorrhagic factor	Increases prothrombin in the blood and controls hemorrhage.	Deficiency of prothrombin in plasma.	?	Fairly stable to heat.	Leafy vegetables Hog liver fat Hemp seed Soy bean oil Cereals Alfalfa	Not known.

Victoria Carlsson, W. C. of U. N. C.
Public Health Association, May 1, 1939.

Vitamin K

In 1935 Dam of Copenhagen observed that newly hatched chicks maintained on a diet which was deficient in certain fat soluble material, but otherwise adequate, suffered fatal hemorrhages into subcutaneous tissues. This condition was controlled by administration of nonsaponifiable, nonsterol fraction of hog liver fat, or by feeding alfalfa[27].

Vitamin K occurs in alfalfa, kale, spinach, dried carrot tops, chestnut leaves, tomatoes and oat sprouts, soy bean oil and vegetable oils, but is not found in significant amounts in fish liver oils.

Very little is known of its physical and chemical properties except that it is heat stable, fat soluble and readily destroyed by alkalis.

It is used clinically in certain diseases where there is a deficiency of prothrombine in plasma. This deficiency may be due to failure of absorption of this vitamin when bile is excluded from the intestinal tract, or when secretion of bile salts is reduced. In pre-operative cases it may be given in some concentrated form to raise the prothrombine of the plasma.

In the past year the sale of vitamins increased five-fold. Although most vitamins are too expensive at present to be added economically to the diet, science has laid a foundation for opening this field in a big business scale. Not only vitamins but minerals like iron, calcium and iodine can be added to this business.

Adding excessive amounts of certain vitamins or minerals to the diet may be dangerous, because other latent deficiencies of perhaps unknown kinds may result. Today we regard an adequate diet as composed qualitatively of many chemically discrete components provided in such state of combination that they are utilized efficiently. An adequate diet can be encouraged by stressing the need for protective foods, such as milk, meat, eggs, vegetables and fruits in the diet.

27. Snell, A. M., J. A. M. A. 112:1457, 1939.

Electrocardiograms.—The real reason for taking an electrocardiogram on every patient with a cardiac arrhythmia is so that after one has studied the records of a large series of cases, he may understand the clinical manifestations of cardiac irregularities so well that he is able to recognize the type of arrhythmia without the electrocardiogram.—Francis W. Peabody: Doctor and Patient, New York, The Macmillan Co., 1939.

DIABETIC COMA

PAUL F. WHITAKER, M.D.
and
KILBY P. TURRENTINE, M.D.
KINSTON

Diabetic coma is probably the most spectacular emergency that we are called on to deal with in medical practice. Only those practitioners who have directed the treatment of diabetic coma to a successful conclusion can realize the real satisfaction that this gives. Our experience in the management of diabetic coma consists of sixteen cases which have occurred in our practice in the last fifteen years. Most of these cases were referred to us by other physicians and were managed on our medical service at Memorial General Hospital in Kinston. Out of the sixteen cases treated three deaths occurred. We feel now that two of these were inadequately treated, and in the light of our present experience we feel that they could probably have been saved by larger doses of insulin.

Pathologic Physiology

The pancreatic hormone insulin is necessary for the utilization of all foods, protein and fat as well as carbohydrate. In the absence of insulin all starch and sugar ingested appears in the urine as glucose. Moreover, from 45 to 58 per cent of the protein content of food and also the body protein which is utilized to maintain life during periods of starvation consists of glucose or compounds similar to glucose. In the absence of insulin this glucose derived from protein also occurs in the urine. Lastly, when glucose is not utilized by the body, the oxidation of both ingested fat and body fat is not complete, and instead of being converted into carbon dioxide and water, the oxidative process is halted before this point is reached and the fat yields various toxic acid substances such as beta-hydroxybutyric acid, aceto-acetic acid, and acetone. These are known collectively as ketone or acetone bodies. Ketone bodies are probably formed in the liver and are then excreted in the urine. Before being excreted in the urine they are neutralized by the alkalis in the tissues and the blood, consisting of sodium bicarbonate and various

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salts of potassium, calcium and magnesium.

Small amounts of ketone bodies are easily tolerated, but the formation of large amounts, such as occurs in severe diabetic acidosis, results in the continuous excretion of sodium salts and other base in the urine. A very small fraction of the acid substance may be neutralized by ammonia and excreted in the urine in the form of ammonium salts; but it is chiefly the sodium and other bases that are involved. At first only the body tissues are affected by this loss of base, and the blood chemistry remains unchanged. Finally, however, after the supply of base in the tissue is exhausted, the sodium content of the blood is drawn on to maintain neutrality. In addition, both the neutralized ketone bodies and sugar must be in solution before the kidneys can excrete them, and as a result there is a tremendous loss of water in their excretion. Associated with the loss of water there is a loss of chlorides. The reason for this is not understood. After all compensating mechanisms fail, the alkalinity of the blood is decreased and eventually the blood becomes slightly acid in reaction. It is not entirely understood, nor for practical purposes is it necessary to understand, how changes in the blood produce the characteristic symptoms of diabetic acidosis and coma.

The extent of these chemical changes can be determined to a considerable degree by analyzing the blood for its carbon dioxide combining power. This is obvious for the reason that if the sodium of the blood has been lost through the urine in the form of sodium salts or has been held in combination with strongly acid ketone bodies, it is unable to combine with carbon dioxide and its carbon dioxide combining power is reduced.

This test is important because a sharp reduction in the carbon dioxide combining power of the blood is tolerated poorly, and is practically always a sign of impending trouble. In the diagnosis and treatment of coma it is more important than blood sugar determinations, which are usually over-emphasized. It is true that if acidosis occurs in diabetes the blood sugar is almost invariably increased, but on the other hand the level of the blood sugar is not always indicative of the severity of the acidosis. For example, a patient in profound coma may not have an unusually high blood sugar; and on the other hand a patient may have a very high blood sugar without coma or even acidosis.

Etiology

Diabetic acidosis and coma are preventable, and when they do occur are usually the result of either ignorance or neglect. Their complications occur in severe diabetic patients as a natural consequence of the disease when treatment is inadequate, or as the result of some other disease, accident, or strain imposed on the patient with diabetes. In mild diabetics they practically never occur save in the presence of some associated disease or complication.

Acute infection—particularly acute colds—extraction of teeth, fractures of bones, prolonged physical or mental strain, and hyperthyroidism are frequent factors that bring on acidosis. Breaking the diet, insufficient amounts of insulin, or omission of insulin are also common causes. Often an otherwise well instructed diabetic will omit his insulin when his appetite fails from some acute infection or other cause, for fear of an insulin reaction. He does not realize that as soon as ingestion of food ceases he begins to catabolyze his own tissues. This food cannot be utilized in the absence of glucose and, consisting largely of fat, it yields large amounts of ketone bodies. In addition, in the presence of infection and other complications, the efficiency of insulin is decreased. The patient is, therefore, omitting insulin at a time when he needs it most, and severe acidosis with subsequent coma may develop within a few hours.

Prevention

At this point, before discussing the diagnosis and treatment of coma, it might be well to outline briefly measures that will prevent it. These measures have been outlined and used by Dr. Woodyatt of Chicago for more than eighteen years, and are tried and proven. They have been used in the practice of the writer for more than twelve years. Knowledge by the patient that he is a candidate for acidosis and coma in the presence of a cold, accident, or any acute infection is essential for him to carry out the preventive steps, and it is the duty of the physician to instil this knowledge into his patient.

When a cold, for example, has developed, the patient should promptly divide the day into six-hour periods. At 6 a. m., 12 noon,

6 p. m. and 12 midnight, he should empty the bladder, test the urine for sugar and ketone bodies, give a dose of insulin and a standard feeding. A standard feeding consists of 400 cc. (2 glasses) of milk, or 300 cc. of orange juice.

The first insulin dose should consist of one quarter of the patient's regular dose for twenty-four hours, plus 5 units. The second dose should have 5 more units than the first if acid is still present. The following doses should be increased by 5 units each dose until diacetic acid is absent, and later on the dosage from period to period should be adjusted as required to control glycosuria and insulin reaction. If the patient is on protamine insulin, the protamine insulin dosage should be continued, and the emergency program superimposed on it.

If early clinical symptoms of actual acidosis are present the program is the same except that feedings are omitted until the symptoms have disappeared. In addition the first dose of insulin should be large enough to cause disappearance of the symptoms in the first six hours. The dose should be ½ to 1 unit per kilo body weight, or even more. It is better to give too much than to give too little and risk coma, which is much more dangerous than an insulin reaction. When symptoms have ceased insulin reactions can be prevented by frequent hourly feedings of 50 to 100 grams of orange juice. As long as sugar appears in the urine there is no danger of hypoglycemic reaction, but it is well to have the patient empty his bladder each time the urine is examined, since residual urine may be misleading.

As soon as the symptoms of acid intoxication have subsided the case becomes one of ketosis without clinical symptoms, and the procedure of six hour examinations and insulin doses as needed should be resumed.

Symptoms and Diagnosis of Diabetic Coma

The initial symptoms of coma are vague and deceptive. It is, therefore, well to suspect acidosis in any case of diabetes whenever any unusual sign or symptom develops. Weakness, headache, thirst, loss of appetite, vomiting, lassitude, drowsiness, and pain in the back, legs, and abdomen are among the common early symptoms. Later dehydration, deep breathing, somnolence, and coma develop. Eventually the breathing becomes shallow and irregular.

The diagnosis of diabetic acidosis and coma should be suspected at the bedside and should be verified by finding in the urine a large amount of sugar and a strongly positive ferric chloride test for diacetic acid. The blood sugar is increased and the carbon dioxide combining power is reduced. As has already been stated, elevation of the blood sugar may not parallel the clinical condition of the patient, but usually the carbon dioxide combining power shows some parallelism to the patient's condition. Definite symptoms do not appear until the carbon dioxide combining power has dropped below 40 volumes per cent and may not appear until it has decreased below 30 volumes per cent. Below 20 volumes per cent the symptoms are usually marked.

Albumin and casts in the urine and elevation of blood urea are usually present in diabetic acidosis and should not be misleading. Leukocytosis often occurs.

Treatment

The treatment of diabetic coma calls for the prompt administration of insulin and fluids to restore the water balance of the dehydrated patient. It should be emphasized that there are no hard and fast rules for its treatment, and that each case should be considered as an individual problem. Nevertheless, it is well to have in mind some standard line of procedure to follow in the management of these cases, and to modify it as necessary for each individual case. It is highly desirable to have these patients in a hospital for treatment in order that proper laboratory observations can be made frequently. Promptness is important, and if the patient is seen at home insulin should be promptly administered before moving him. The earlier the treatment is started, the better the prognosis; and the longer it is delayed, the more grave the prognosis.

Diabetic coma and shock have many points of similarity, and the adjuncts to treatment in both are much the same. The bed should be warmed before receiving the patient, and the patient should be kept warm by hot water bottles. Unless the patient is moribund, gastric lavage should be done with a warm solution. Five per cent solution sodium bicarbonate is satisfactory, and after removing the gastric contents 250 to 500 cc. of the solution may be left in the stomach. Following this a cleansing enema is given routinely.

The dosage of insulin is that amount which will accomplish the purpose for which it is given, and it will vary according to the age of the patient, the severity and duration of the acidosis, the previous dosage of insulin and, to some extent, according to the usual dosage of insulin. For example, a patient taking 40 units of insulin a day will obviously need a larger dose than a patient who has never taken insulin. Generally speaking we give large doses at frequent intervals—from 50 to 100 units, usually the latter, every thirty minutes to an hour until improvement is noted. We prefer to risk overdose and a resulting insulin shock than underdose and death by coma. As soon as the patient is able to retain fluid by mouth, orange juice, ginger ale, sweetened coffee and tea should be given frequently to counteract the insulin. If it is felt that the insulin is not being absorbed, it may be given intravenously instead of subcutaneously.

Treatment is greatly facilitated by the frequent determination of blood chemistry, but can be carried out with hourly urinalyses as the only guide to treatment. Twenty or 30 units can be given when the urine turns red with Benedict's Solution, 15 units when orange and 5 or 10 units when green.

Patients in diabetic coma are almost invariably dehydrated, and quick restoration of body fluids is necessary. We usually give an initial intravenous administration of 1000 to 3000 cc. of normal saline and continue it by hypodermoclysis. The total amount per day may be as high as 7000 cc.

It is common practice to give glucose intravenously at the beginning of coma. We do not see the necessity for this, because the patient is already pouring out enormous amounts of glucose in the urine, and furthermore, its administration interferes with the evaluation of the treatment. We believe this practical consideration carries more weight than any theoretical benefit that might ensue from increasing the amount of utilizable carbohydrate.

The blood sugar may often drop before the carbon dioxide combining power rises. If the lag in recovery of the carbon dioxide combining power is too great, then 250 to 500 cc. of 3 per cent sodium bicarbonate solution can be given intravenously. Ultimately the carbon dioxide combining power returns to normal as a result of liberated bases previously combined with ketone bodies. Joslin does not recommend the use of alkalis. Large amounts are definitely contraindicated for reason of the fact that they will cause alkalosis, but the judicious use of small amounts is, in our opinion, indicated at times.

Circulatory failure is indicated by falling blood pressure and at times by anuria. The cause of death may possibly be due to the toxic action of ketone bodies on the myocardium, but it seems more reasonable to assume that death occurs, as in shock, from insufficient volume of circulatory fluid. This is best corrected by fluids rather than cardiac stimulants.

In conclusion it may be said that the prognosis depends on many factors—the age of the patient, complications, and the length, degree and duration of coma. Coma is preventable and should be prevented. When it does develop, if it is detected early, the life of the patient can usually be saved.

PROPHYLACTIC MEASURES OF PROVEN VALUE IN SOME OF THE INFECTIOUS DISEASES

J. BUREN SIDBURY, M.D.

WILMINGTON

The progress that has been made in preventive medicine in the past twenty-five years has been phenomenal. The span of life has been lengthened by ten to fifteen years, and the control of infectious diseases has been gratifying to the medical profession and comforting to the laity. Many heartaches and sorrows have been spared to millions of our population by the prevention of disease and death.

Briefly I wish to call your attention to those measures which are at our command, with a desire to encourage their more general use.

Small Pox

There was a time in the memory of many of us when small pox was a menace to our population. It was Jenner who gave to us the simple procedure of small pox vaccination, which has so nearly eliminated this disease that our Health Department does not now class it as one of the quarantinable diseases. We know that small pox can be

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eliminated entirely by vaccination. By some it is felt that vaccination between six and twelve months is less dangerous and more desirable than at six years.

Typhoid Fever

During the War between the States typhoid fever killed more men than died on the battle field. This was true of all wars until the World War, when all soldiers were given typhoid vaccination before going in the trenches. As a result of this, typhoid and paratyphoid fever were a negligible factor in the World War. Having had this practical demonstration of the effectiveness of typhoid vaccination, we should have as many as possible of our population vaccinated every three years for four or five series, and thereafter when there is any definite exposure. Too often we wait for an epidemic before urging typhoid vaccination. Each year not later than April or May the local health officer and the State Board of Health should bring this to the attention of the public by means of the radio and press. Our people expect us to keep them informed along these lines.

Scarlet Fever

The prophylactic measures used in scarlet fever have not been as successful nor as widely used as some of the other remedies we will discuss. One of those used is scarlet fever toxin which is given in five graduated doses. The number of doses has been one deterring factor, and many hold that all that is accomplished by these injections is the prevention of the rash in scarlet fever, which creates a distinct obstacle in the diagnosis of the disease. The duration of this immunity is short, probably one year.

Most of us found that the administration of scarlet fever antitoxin was accompanied by many cases of serum sickness. Often the prophylactically treated case was sicker than the patient with scarlet fever.

As a result of the relatively short duration of immunity and the frequent occurrence of serum sickness this prophylactic procedure has not been extensively used. Too, the susceptibility to scarlet fever is much less than to measles and whooping cough—probably less than 15 per cent of the population being susceptible to scarlet fever. However I do advise a Dick test on all student nurses and interns, especially those who have to work in hospitals for contagious disease.

Diphtheria

For about twenty-five years now the medical profession, led by the late Dr. W. H. Park, has been at work on the prophylactic treatment of diphtheria. Probably more intensive educational campaigns have been waged in New York City than in any other place in this country. When we see that the deaths last year from diphtheria in New York City, with a population of over seven million, were only 27, while our state with half that population had 188 deaths, we are convinced that diphtheria is a problem that requires our earnest support.

Thanks to our able senator, Dr. T. W. M. Long, we now have a law which requires immunization against diphtheria of all children between the ages of six months and six years. A certificate must now be presented as a requisite to entering the public schools of North Carolina.

At first toxin-anti-toxin was used in three to five doses one week apart. Later toxoid in two or three doses, and still later alum precipitated toxoid in one dose and then two doses six to eight weeks apart, were advocated. It is felt that one dose of alum precipitated toxoid will immunize 85 per cent of the cases and two doses will immunize 95 per cent. For this reason two doses are given. It is advisable to have Shick tests done each year for five or six years to detect the small per cent who lose their immunity.

If the contacts can be seen daily and cultures obtained, it is not advisable to give antitoxin prophylactically. If such is not possible, I feel that we should play safe and give 1000 to 1500 units of diphtheria antitoxin to members of a family which has a definite clinical case.

Tetanus

The question when to give tetanus antitoxin in abrasions and puncture wounds is ever being asked the medical man as well as the surgeon. No one knows definitely how to answer this question, but in doubtful cases we have to play safe and give the antitoxin. We know, or believe, that much tetanus antitoxin is given unnecessarily, but we do not know how, safely, to avoid this. Recently, however, it has been found that tetanus toxoid can help solve this difficult problem.

If two doses of 1 cc. each of tetanus toxoid are given at two or three month intervals, the tetanus antitoxin concentration in the blood is brought up to a point not quite sufficient to give protection from the disease; but if a third dose of 1 cc. of tetanus toxoid is given the tetanus antitoxin in the blood will immediately increase and rise to a higher level than when 1500 units of tetanus antitoxin is given and this level is sustained in the blood stream longer than when tetanus antitoxin is given.

A routine which is practical would be to give 1 cc. of tetanus toxoid at the same time that diphtheria toxoid is given. Give 2 doses at two month intervals. Later, if the child gets an injury, a third dose of tetanus toxoid may be given instead of tetanus antitoxin. The dangers of horse serum reactions are thereby eliminated.

A measure which I have routinely adopted is to give all patients with eczema, hayfever and asthma two injections of tetanus toxoid at two or three month intervals. If they get a rusty nail puncture later, they are given the third dose of tetanus toxoid, 1 cc., and no antitoxin is given.

Whooping Cough

I know that all of you who have done much general practice have given whooping cough vaccine. I have probably given a barrel of the vaccine originally put out by our State Board of Health. I do not believe it benefited 10 per cent, if any of the cases. It was often given for the lack of something better to do, when doing nothing would have been better practice.

Sauer's whooping cough vaccine is of definite value as a prophylactic remedy, but not as a therapeutic remedy. Dr. Sauer advises that it should be given three to four months before exposure if beneficial results are to be expected.

In the past four years I have given 290 infants and children Sauer's whooping cough vaccine as a routine prophylactic measure. Of this number seven cases developed pertussis either while being treated or within two weeks after treatment was finished. Two children developed light cases three years later.

In one family of four children, ages four, three, two years, and five weeks, the oldest child was treated at ten months with Sauer's whooping cough vaccine. One month ago the three and two year old sisters developed very definite cases of whooping cough with all the typical signs, cough and whooping, and vomiting. The older child escaped. The five weeks old infant was given hyperimmune serum after being exposed to his sisters for ten days. Three doses of 10 cc. each were given three days apart. He was beginning to cough when the serum was started. At the end of one week he had stopped coughing and escaped completely.

Another four weeks old baby was exposed in his own home to his sister and aunt who had whooping cough. He had been coughing for one week when serum was given, and two doses of 10 cc. of hyperimmune serum at three day intervals satisfactorily aborted his case.

A third patient, who had had severe pertussis for three weeks, was given four doses of 12, 20, 30, and 20 cc. at three day intervals. He was very little improved at the end of four weeks. Because of his anemia he was given two transfusions which could well have explained the slight improvement he made. At the end of four weeks he still had bad and rather frequent paroxysms. This case showed a blood count on admission on February 25, 1939, of Hgb. 65 per cent, RBC 4,000,000, WBC 57,850, Polys 76, Lymphs 22, Monos 2. On March 4 the blood examination after two transfusions showed: Hgb. 100 per cent, RBC 5,200,000, WBC 29,000, Polys 47, Lymphs 50, Monos 2, Eosinophils 1.

A fourth case was an infant of three months who had had whooping cough for two weeks when the hyperimmune whooping cough serum was given. She received three doses of 10 cc. each at two day intervals. Her blood examination on admission showed: Hgb. 60 per cent, WBC 31,030, RBC 3,375,000, Polys 16, Lymphs 84. Because of her anemia she was given two small transfusions on successive days in conjunction with the hyperimmune serum. Her last dose of hyperimmune serum was given at the end of the third week. Her blood examination following the transfusions and serum showed: Hgb. 85 per cent, RBC 4,150,000, WBC 25,860, Polys 20, Lymphs 80. A very definite but not spectacular response to the serum was obtained in her case.

In three of these four cases a definite response was obtained. Those receiving the

serum early responded more promptly. The other case was too late in the disease to expect much result. On account of the severity of his case he was given large doses.

The hyperimmune whooping cough serum is otherwise known as Lyophile "Pertussis Immune" serum. "This serum is prepared by pooling the bloods of a number of healthy adults who have had whooping cough in childhood and whose protective substances have been 'fortified' by repeated courses of Sauer's vaccine. The technique of collection and preservation fulfills all the requirements of the United States Public Health Service." This product may be obtained from the Philadelphia Serum Exchange, Children's Hospital, 1740 Bainbridge Street, Philadelphia, Pa. It may be of value in the treatment of whooping cough if given early in the disease. Twenty to thirty cc. may be given at one dose, and two or three doses may be given.

Rabies Vaccine

Rabies vaccine, of course, should be given as early after the bite of a rabid animal as possible. A delay of two or three days is safe if the bite is not located on the head or face. The original 21 day treatment has been supplanted by the 14 day treatment—a saving of no little consideration.

Measles

In 1927 a number of high school boys who had recently had measles were bled and their serum was given to infants and children who had been exposed to measles. It was found that if as much as 5 or 10 cc. of recently convalescent serum was given before the seventh day of exposure measles could be prevented in the great majority of cases. Since then this idea of convalescent serum or whole blood has been extensively used to prevent measles and other infectious diseases, especially in feeble infants. Dr. McKhann, of Harvard, has perfected a commercial product, "Immuno-Globulin", which accomplishes the same protection with much less volume in dosage. Two cc. of Immuno-Globulin repeated in three or four days usually protects, if given within seven days from the time of exposure.

The following charts show the results I have obtained in the past ten years with the three methods of procedure. The whole blood injections have some disadvantages, but in my hands have yielded the highest percentages of protection.

Year	*No. Cases*	*Exposed*	*Amt. Given*	*Completely Protected*	*Partially Protected**	*Not Protected*
CONVALESCENT SERUM						
1928	69	1-7 days	5-10 cc.	43	25	1
1928	15	8-12 days	5-10 cc.	8	7	0
TOTAL	84			60.7%	38.1%	1.2%
IMMUNO-GLOBULIN						
1938	92	1-7 days	2 cc.	53	32	7
1938	5	8-12 days	2 cc.	1	2	2
TOTAL	97			55.7%	35%	9.3%
WHOLE BLOOD INJECTIONS						
1933	107	1-7 days	20-40 cc.	60	43	4
1933	24	8-12 days	20-40 cc.	9	11	4
1938	32	1-7 days	20-40 cc.	24	8	0
1938	1	8-12 days	20-40 cc.	0	0	1
SUMMARY						
Whole Blood	164	1-12 days	20-40 cc.	56.7%	37.8%	5.5%
Convalescent Serum	84	1-12 days	5-10 cc.	60.7%	38.1%	1.2%
Immuno-Globulin	97	1-12 days	2 cc.	55.7%	35. %	9.3%
TOTAL	345			57.4%	37.1%	5.5%

*Very slight rash, no temperature.

DISTRIBUTION OF SYPHILIS AMONG THE PATIENTS IN PEDIATRICS AND OBSTETRICAL PRACTICE

D. E. ROBINSON, M.D.
W. B. PERRY, M.D.*
H. R. GERMER, M.D.,
G. M. LEIBY, M.D.†

For the past three years the campaign against syphilis in the United States has been gaining momentum. Morbidity statistics indicate that the emphasis and the energy being expended in this direction are well justified. The attitude and policy of the profession has been one of constant awareness of the true seriousness of the situation. It has attempted to avoid exaggeration of the facts, and hysterical propaganda. It has striven against indifference and the assumption that, although syphilis may be prevalent, it does not occur in private practice.

Congenital syphilis, like many other problems concerning the infant, calls for the cooperation of the obstetrician and the pediatrician. It is this territory which we have in common, the pregnant woman and her infant, that we have attempted to explore. Two surveys have been made. Members of the State Pediatric Society contributed to one. This probably gives a fair picture of the facts as experienced in private pediatric practice. Another study conducted through the cooperation of Dr. R. L. Carlton and Dr. J. R. Hege presents the problem in an industrial community of North Carolina. To them and to the obstetricians and pediatricians we wish to express our sincere appreciation for their help with these studies.

For a moment we shall consider the results of the first survey. The purpose was to determine the Wassermann status of the group studied. There were 514 infants under 12 months of age and their mothers. Five hundred and nine were white; five were colored. Among the infants 248 were males, 201 were females; in 60 sex was not reported. Four hundred and ninety had no Wasserman test; twenty-four had tests. Nineteen were negative; four were positive; one was doubtful. Three infants with positives were tested at two months; one at one month. Two mothers with positive infants had had tests which were positive in the third trimester and no treatment. One had a positive test in the first trimester and three intravenous treatments. One had had no test.

Of 506 mothers reported, 281, 55.5 per cent, had no test; 225, 44.5 per cent, had tests. Three were positive, 164 were negative, and the result of the test was not reported for 58. Fifty-five were tested in the first trimester; four in the second; eight in the third; in 158 the time of the test was not reported.

Data from institutions taking Wassermanns as a routine procedure on all pregnant women and infants have not been included. However, the result of their work is reflected in this series in so far as these infants came under the care of these pediatricians.

From these figures it appears that in private pediatric practice the Wassermann test is being used as an aid to diagnosis. Syphilis was discovered in about 0.8 per cent. Among pregnant women Wassermanns have been taken routinely by a few practitioners.

We now come to the second phase of this investigation. This survey was undertaken in the effort to find the prevalence of syphilis among parturient women, and thereby link the problem to the major one of congenital syphilis. The study was set up along the lines adopted by Leiby, Dyer, and Turner[1] in their survey of the Eastern Health District in Baltimore. These investigators have shown that the study of syphilis in the pregnant woman is the best index to use in evaluating the amount of syphilis in a community. The sample of population produced year after year by pregnant women is quite representative of the total population. Pregnancy selects a cross section of the population indiscriminately.

A large city in the Piedmont region of North Carolina was selected to make the study. This city is made up of a population 65 per cent of which are white and 35 per cent colored. In the area marked out in the city for the study live approximately 60,000 people. Practically all of the colored group live in this area. All of the births occurring in this area during 1938 were investigated.

This city has diversified industry, chief

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1. Leiby, Dyer, and Turner: The Prevalence of Syphilis Among Parturient Women As An Index of the Prevalence of Syphilis in the Community; to be published.

among which is the handling and manufacture of tobacco products. The nature of the work performed gives a relatively stable population. However, at certain times of the year there is an influx of people who work for a short time and then leave to return at the same time the following year. The list of births occurring in this area was obtained from the official birth records in the health department. In the study we chiefly resorted to the "shoe leather" type of epidemiology by door to door canvass of the women in the group.

In this group of 428 white women and 611 colored women who were delivered during 1938 in this area, syphilis was discovered in 1.2 per cent of the white women and 7.1 per cent of the colored women. The negative Wassermann test was found in 27.8 per cent of the white women and in 47 per cent of the colored women. Of those not tested 71 per cent were white and 45.8 per cent were colored women.

Of the women with a positive syphilis status approximately a third received treatment during pregnancy. The idea was quite widespread among the clinic patients that treatment for syphilis received regularly prior to conception should be discontinued during pregnancy.

In many instances the treatment was instituted late. Treatment varied from a few injections of bismuth or arsenic up to adequate treatment with bismuth and arsenic throughout pregnancy.

Our investigation revealed that 8.6 per cent of the white parturient women and 15 per cent of the colored women received a Wassermann test during the first trimester of pregnancy. The peak in both races was reached during the second trimester, when 12.2 per cent of the white women and 19.3 per cent of the colored women in the group received a Wassermann test. During the third trimester 4.2 per cent of the white women and 8.1 per cent of the colored women had a Wassermann test.

In many instances we questioned women with a positive syphilis status who had a negative Wassermann test during pregnancy. Often they made no mention to the physician who saw them at this time of their past treatment for syphilis. Some purposely misled the physician as to their past syphilis status. In addition to the Wassermann test it was necessary to question the woman thoroughly concerning past pregnancies. This assumed increasing importance in the face of a negative Wassermann test. It is well known that treatment received in the past probably sufficient to reverse the Wassermann test will not always prevent congenital syphilis in the offspring of the present pregnancy, and will cause some cases to be overlooked.

The families were classified as to their economic status. Those in class A belong in the higher economic bracket and are able to afford luxuries. Class B families have the necessities and a few luxuries. Those in class C have the bare necessities of life, and many are dependent on charity. It has been found that this method of grading is as efficient as a more complicated method of appraisal.

Among the 430 white women interviewed we found 23 per cent to be in class A. None in this group were found to have a positive syphilis status. One third had a Wassermann test. Two thirds were in the unknown category. Forty-eight per cent of the white women were in class B. None were found with a positive syphilis status among this group. In this group 16.6 per cent had a Wassermann test, and 83.4 per cent were unknown. In the class C economic status we found 28.6 per cent of the entire distribution of white women. There were four women in this group with a positive syphilis status. Nearly half of class C had received a Wassermann test, 57 being of negative syphilis status. The highest percentage of Wassermann tests taken in the white group was found among the women of class C economic status. This would seem to indicate that the index of suspicion was higher among physicians when they considered white patients of this class.

Now when we consider the distribution of the colored women according to syphilis and economic status we find that of the 603 women about 1 per cent are in class A, 54 per cent are in class B, and 45 per cent are in class C.

Here again, as with the white group, there were no cases of syphilis associated with the A economic status.

Among the colored women in class B we found nine with a positive syphilis status. This represents a syphilis rate among the known of 4.6 per cent.

In class C we find that 51 per cent of the

colored women had a Wassermann test. The incidence of syphilis in the tested group was 12.9 per cent.

If it be assumed that the tested and untested individuals of class C were homogeneous, then by applying the specific rate of the known to the unknown portion of the population it could be reasonably expected that 4 more cases existed in the white group and 17 more in the colored. This suggests that 57 per cent more syphilis was present among this group of pregnant women than was observed.

In the study of stillbirths we found 10.8 per cent of the total number to be associated with a mother of positive syphilis status. 48.6 per cent of the stillbirths were associated with a negative Wassermann test in the mother.

The study of the premature babies showed the same general trend. Here there were 16.6 per cent of the premature babies associated with a positive syphilis status in the mother. The mothers of 30 per cent of the premature babies had a negative syphilis status. The mothers of 53.4 per cent of the premature babies had no Wassermann test. The percentage of prematures associated with mothers of positive status was found to be 35 per cent, considering only those whose status was known.

It is appreciated that the small numbers in these groups make the rates unreliable, but it is the intention and hope of the authors that further studies of the same population be carried out at regular intervals. We believe that this study will serve as the base line in evaluating the progress of syphilis control in the pregnant women of this community.

Importance of the General Practitioner.—Can the public get along without the general practitioner? To those who are in a position to see the helpless flounderings of the unfortunates who pass from specialist to specialist the answer is very clear. Never was the sound general practitioner more important than he is today. Never was the public in need of wise, broadly trained advisers so much as it needs them today to guide them through the complicated maze of modern medicine. The extraordinary development of medical science, with its consequent diversity of medical specialism and the increasing limitations in the extent of special fields—the very factors, indeed, which are creating specialists, in themselves create a new demand, not for men who are experts along narrow lines, but for men who are in touch with many lines.—Peabody, Francis W.: Doctor and Patient, New York, The Macmillan Company, 1939.

THE PLACE OF EDUCATION AND PUBLIC HEALTH IN CANCER CONTROL

C. C. CARPENTER, M.D.
AND
R. P. MOREHEAD, M.D.

WAKE FOREST

We might simplify this discussion and save time by saying that, in our opinion, the hope for cancer control rests with the two agencies mentioned in our title. But in medicine, as in many other things, we must constantly call attention to seemingly obvious facts. Recently at a staff meeting of the Memorial Hospital in New York, Dr. Ewing said: "Cancer is by far the most important public health problem among the many that are now occupying public attention." During the campaign put on by the Women's Field Army this year, we have visited almost every section of North Carolina, and in every section we have found the public eagerly seeking information about cancer.

When one of us (Carpenter) served as the first Chairman of your Committee on Cancer, Dr. J. W. Cox, Southern Representative of the American Society for the Control of Cancer, came to inform him of a movement by the Federation of Women's Clubs to have cancer knowledge disseminated by that organization. Obviously, their interest was stimulated by the knowledge that approximately 45 per cent of deaths from cancer are due to involvement of the reproductive organs in women. At the National Meeting of the Federation that year (1934) the movement was adopted as the Women's Field Army. They agreed to carry on their program under the direction of the Cancer Committee of the various state medical societies.

The organization in North Carolina began in 1937. It has a State Commander, Mrs. D. S. Coltrane, and various "captains" and "lieutenants" in the districts, counties, and towns of the state.

As most of you know, their drive to gain funds and to disseminate knowledge to the laity took place during the month of April. It is along the usual plan of such organizations as the Red Cross. People are asked to enlist and to contribute one dollar or more for the membership.

The commander, speakers and helpers

serve without compensation, and in the majority of cases without even expenses. All funds go to pay for literature and posters. Funds have not been received sufficient to carry on the work, so that they now are more than five hundred dollars in debt. It is their hope to remove that debt and raise sufficient additional funds to start a permanent cancer clinic.

But they keep before us the subject of cancer. They are now asking the State Board of Health to adopt cancer control as a part of its program.

The first State Board of Health was established in Massachusetts on June 21, 1869. Cancer was first mentioned in its report of 1896. A definite cancer control program was first established by the same board of health in 1925, and then only after interested laymen had demanded it. Many physicians and the Commissioner of Health objected to the state's including cancer in its program, claiming that it did not come within the scope of public health. We, no doubt, will face similar opposition in North Carolina. But we must not interpret public health work in the narrow sense of relating only to contagious diseases that may become a public menace. Instead we would do well to think of it as expressed by the first chairman of the Massachusetts board in his report, when he said, "The State Board of Health will adopt the fine old maxim, pagan though it be, that nothing which pertains to humanity in its widest sense, will this board deem foreign to its aims."

Since cancer can be prevented by correcting so-called pre-cancerous conditions, systematic health education is imperative, if we are to show results. The only agency capable of carrying on a sustained and effective program is the State Health Department.

The approach to cancer prevention must be a cooperative plan between the public, the private physician and the State Health Department. We are now effectively interesting the individual in helping himself. He is demanding and getting information about preventive methods. If he is to use this information correctly, the private physician must be prepared to handle his case in the light of the knowledge that exists. Unfortunately, the great majority of physicians are kept so busy practicing curative medicine that they have no time to consider preventive measures. This is evidenced by the fact that the state-wide clinics that were held at the Wake Forest Medical School were attended by men majoring in cancer treatment. The general practitioner has been conspicuous by his absence.

The Massachusetts Board of Health in the beginning had the same experience. During the first two years the clinic was established only 51.4 per cent of the patients were referred by physicians; but eight years later they were sending 77.3 per cent of the cases.

In our opinion, the key man to the entire program must be the county health officer, and through him the general practitioner must be reached. The public health man must keep constantly before the private physician the necessity for taking early diagnosis seriously. We have "preached from the house top" that the family physician is the first line of defense in cancer control, but we have not altogether succeeded in persuading him to accept the role. This he must do if cancer is to be diagnosed and cured in the early stages. We all must admit that the annual health examination movement has not progressed rapidly, because the family physician has not interested himself in it.

We would have in the end a three way cooperative movement combining the efforts of the county health department, the family physician, and the public.

Results would be obvious. We do not have to guess, with the extensive knowledge available about cancer, that the mortality could be easily cut in half. Perhaps the knowledge that all cancer is recognizable while yet a localized lesion that can easily be removed is so commonplace to physicians that they take it lightly. Certainly there are statistics enough available to show that about 97 per cent of cancer of the cervix develops in those having improperly treated endocervicitis; that Lugol's solution will often reveal lesions too small to be seen otherwise; that transillumination of the breast will reveal small tumors not detectable by the old method of palpation alone; and many other facts too numerous to mention.

Public Health through health education has always taken the lead when preventive measures have succeeded. Cancer must be included in the public health program, as something "which pertains to humanity, in its widest sense."

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APRIL, 1940

THE EIGHTY-SEVENTH ANNUAL MEETING

Since scientific progress is made chiefly by a process of trial and error, it is inevitable that errors must occur, if progress is to be made. It is now generally agreed that the Medical Society of the State of North Carolina made an error last year in its trial of a cruise to Bermuda for its annual meeting. Although apparently successful for bankers and lawyers, cruising does not make for a successful medical meeting. The papers presented—as witness those in the first issues of the NORTH CAROLINA MEDICAL JOURNAL—were of a high order; but it was discouraging to their authors to present them to mere handfuls.

This, however, is another year; and the 1940 meeting, to be held at our favorite Pinehurst, should attract a record attendance. The chairmen of sections have been hard at work preparing good programs. President William Allan has carried on in spite of physical handicaps—so let us show our appreciation by giving him the largest attendance yet recorded. Last year many faithful ones regretfully broke long attendance records. They can begin new records, however, with the reasonable assurance that it will be many years before another cruise is undertaken.

Osler's time-honored definition of the medical society as "a school in which the scholars teach each other" is eternally appropriate. "The society helps to keep a man 'up to the times', and enables him to refurnish his mental shop with the latest wares. It keeps his mind open and receptive, and counteracts that tendency to premature senility which is apt to overtake a man who lives in a rountine."[1]

The question that every doctor in North Carolina should ask himself is not "Can I afford to go to Pinehurst?", but "Can I afford not to go?".

1. Osler, William: On the Educational Value of the Medical Society, from Aequanimitas and Other Addresses. Philadelphia: Blakiston, 1930.

* * * *

"NOW IS THE TIME FOR ALL GOOD MEN—"

The National Physicians Committee for the Extension of Medical Care is fighting the battles of the rank and file of the medical profession of the United States. There has been some quibbling as to whether such an organization should have been formed, or whether the American Medical Association should have entered the conflict instead. There are arguments on both sides, but these arguments are largely academic and beside the mark. The National Physicians Committee is acting as the champion of organized medicine in its struggle against those who would regiment the physicians of America as those of Europe have been regimented. Let us who are in the ranks not lose sight of the fact that the men who constitute the executive board of the Committee are all men of unquestioned ability, integrity and force, and are giving freely of their time and intellect to fight our battles. Let us for whom they are fighting back them up with our support, financial and otherwise. A check sent to Dr. N. S. Davis, III, 700 North Michigan Avenue, Chicago, will help furnish ammunition for these gallant defenders of the medical faith of America.

REPLY TO DR. SCHAFFLE

The NORTH CAROLINA MEDICAL JOURNAL is glad to present Dr. Karl Schaffle's criticism of the editorial in the February issue, "The Scarcity of Doctors". This journal belongs to the whole membership of the Medical Society of the State of North Carolina, and welcomes free expression of opinion in its columns, so far as its space limits will permit.

First of all, this journal appreciates the very kind reference to our first two issues, knowing that it is "praise from Sir Hubert". In return, it may be truthfully said that Dr. Schaffle is doing an excellent job as editor of the *Bulletin of the Buncombe County Medical Society.*

Next, the editor of the NORTH CAROLINA MEDICAL JOURNAL wishes to state emphatically that he does not expect to follow in the wake of Dr. Fishbein or of anybody else; but he does intend, to the best of his ability, and with the help of the editorial board, to make the magazine speak the sentiments of the majority of the doctors of North Carolina. Dr. Schaffle seems to attach undue importance to Dr. Fishbein's views on medical practice. Dr. Fishbein has merely carried out very ably the mandate of the 116,500 members of the American Medical Association, as expressed repeatedly through its House of Delegates.

The NORTH CAROLINA MEDICAL JOURNAL is not alone in fearing the socialization of medicine. A recent bit of proof was afforded by a nation-wide referendum conducted by *Modern Medicine.* Of 20,215 United States doctors—including 241 from North Carolina—85 per cent (from North Carolina, 87 per cent) said they would refuse to cooperate with a federal legislative program tending toward drastic curtailment of the private practice of medicine. Eighty-eight per cent thought that such a program would result in a deterioration of medical service in the United States.

"As for Russia", Dr. Schaffle will have to go back nearly eighty years to antedate state medicine. In an article strongly advocating socialized medicine, Dr. Henry Sigerist[1] states that "as early as 1864, Russia established a complete system of state medicine for the rural districts; since Russia is an agrarian country, this meant that the majority of the population received medical care from salaried district physicians and paid for their services through taxation." Since most of the really great medical discoveries have been made since 1864, it is easy to believe that Russia's health has improved since then.

Even if Russia's physical health has been improved, its moral and spiritual health certainly has not. The total lack of any national sense of honor and of individual self-respect in that country and its ally, Germany, is a horrible example of the fruits of totalitarianism. To quote again the last sentence of the editorial in question: "It will be agreed that there are many other factors than socialized medicine to explain health conditions in Germany and other European countries; but the stubborn fact remains that the socialization of medicine was the entering wedge for totalitarianism in Germany and Russia."

Certainly it is to be hoped that this new journal will "take a more independent view of the social problems of medicine than to blindly fall into the ruts made by others." However, comparing the progress made in this century by American medicine with that in Europe (even Sigerist admits that "American leadership in medical science is universally recognized"), it seems to this journal that in upholding the American way, it is following a brightly blazed trail, and avoiding the ruts made by European medical systems.

1. Sigerist, Henry E.: The Realities of Socialized Medicine, Atlantic Monthly, 163:797 (June) 1939.

* * * *

North Carolina doctors may be justly proud of the two monthly Bulletins published by county medical societies. One of these, the *Bulletin of the Buncombe County Medical Society,* is older than our NORTH CAROLINA MEDICAL JOURNAL, being now in its fourth volume. It is published in Asheville under the able editorship of Dr. Karl Schaffle, who succeeded Dr. G. W. Kutscher, Jr. this year. The other publication, the *Bulletin of the Mecklenburg County Medical Society,* made its first appearance in March, edited by Dr. T. W. Baker. Both of these Bulletins present a very attractive appearance, well suited to their content.

CASE REPORTS

SOLITARY INTRACRANIAL TUBERCULOMA IN AN ADULT

F. T. HARPER, M. D. AND
I. HOROWITZ, M. D.

SANATORIUM

The incidence of tuberculoma of the brain is about 2 to 4 per cent of brain tumors, according to Dott and Levin[1], and about 1.6 per cent in Cushing's series. The ratio of tuberculomata to malignancies of the brain is 1:30[2]. This condition is much more frequent in children than in adults; according to Warthin it constitutes over 50 per cent of brain tumors in children[3]. As age advances it becomes rare. Tuberculomata vary in size from a pea to an apple, and they are more often multiple than solitary. They produce symptoms similar to those of any other brain tumor, depending on the location. They usually undergo caseation, and very rarely calcify. All are fatal regardless of therapy. There is a predilection for the cerebellum, cerebrum and pons in order named. Most cases occur in males. Literature is abundant on tuberculomata of the brain occurring in children. Many cases are reported by Corica[4], Zappert[5], Gleich[6], Freidenwald[7], and Ferris[8]. A case occurring in an adult has been reported by Ardin[9] in which there was a solitary tuberculoma in the pons. Montgomery[10] reported a tuberculoma in a sixty-nine year old white male in the corpus callosum with miliary tuberculosis, but no meningeal involvement. Allende[11] reported a case in a twenty-three year old male involving the cerebellum, associated with meningitis and miliary tuberculosis. Carnot[12] reported two cases in adults, one in a twenty-eight year old patient with miliary tuberculosis and meningitis in which there was a tuberculoma in the left thalamus invading the internal capsule. The other was in a patient twenty years of age, with a tuberculoma in the right thalamus. Others briefly reporting are Dimitri[13], Bremond[14], McClelland[15], Tomasi[16], and Sorrel[17], each reporting one case, and Ferris reporting 4 cases confirmed by autopsy. Tuberculomata occur less frequently in the brain than in any other part of the nervous system. According to Osler they exist in three ways: As an acute miliary infection causing meningitis and acute hydrocephalus; as a chronic meningo-encephalitis, usually localized and containing small tuberculous nodules; as a solitary tuberculoma.

Case Report

R. H., a twenty-seven year old, colored sawmill worker, was admitted to the North Carolina Sanatorium July 28, 1939, acutely ill and unable to stand or sit. He was not mentally alert, and the history is rather vague.

History of present illness: This patient had a series of complaints: paralysis of the right arm and leg and left side of the face, cough and expectoration, and draining glands in both inguinal regions. On March 14, 1939, he had been admitted to the Anson County Sanatorium, complaining of pain and swelling of the scrotum of about three months' duration. Following spontaneous rupture with drainage for a month, an incision had been made into the scrotum one week prior to his admission. There had been no evidence of healing. The patient stated that he had had a productive cough for several years. At this time the physical findings in the left lung were those of a far advanced

1. Dott, Normal M. and Levin, Ernest: Intracranial Tuberculoma, Edinburg M. J. 46:36 (January) 1939.
2. Schidlowsky, P.: Zur Frage der Tuberculome des zentralen Nerven-systems, Arch. f. klin. Chir. 155:703-710, 1929.
3. Jaffe, R. H. and Schultz, A.: Relations Between Tuberculomas of Central Nervous System and Tuberculous Changes in Other Organs, Am. Rev. Tuberc. 33:302 (March) 1936.
4. Corica, A.: Contribute clinico ed anatomo-patologico allo studio dei Tuberculomi cerebrali multipli, Pediatria, 24: 660-666, 1918.
5. Zappert, J.: Der Hirntuberkel im Kindesalter, Arb. a. d. Neurol. Institute a. d. Wien Univers. 16:78-150, 1909.
6. Gleich, Morris: A Case of Solitary Cerebellar Tuberculoma, Arch. Pediat. 42:273-275 (April) 1925.
7. Freidenwald, Edgar B.: Tuberculous Tumors of the Brain, Am. J. Dis. Child. 8:508 (June) 1915.
8. Ferris, Henry W.: Eight Cases of Tuberculoma of the Brain Found at Necropsy, J. A. M. A. 92:1670 (May) 1929.
9. Ardin-Delteil, M.: Tubercule of the Protuberance, Rev. neurol. 2:464-473 (October) 1925.
10. Montgomery, L. C.: Hemiplegia Due to Tuberculosis of the Corpus Callosum, Canad. M. A. J. 29:375 (October) 1933.
11. Allende, I.: Tuberculoma of the Cerebellum with Syndrome of the Pontocerebellar Angle, Rev. Asoc. med. argent. 34:48-68, 1921.
12. Carnot, P.: Two Cases of Tuberculoma of the Optic Layer, Bull. et mem. Soc. med. d. hop. de Paris, 52:837 (May 31) 1928.
13. Dimitri, V.: Tuberculoma of the Pons Cerebelli (pons varolii), Rev. de especialid. 1:600 (July 30) 1926.
14. Bremond, M.: Tuberculoma of the Cerebellar Hemisphere with Pontocerebellar Symptoms, Rev. d'oto-neuro-opht. 7:26 (January) 1929.
15. McClelland, Carl: Tuberculoma of the Cerebellum, J. Michigan M. Soc. 121:15 (January) 1922.
16. Tomasi, Lugi: An Interesting Case of Tuberculoma of the Right Cerebellar Lobe, Policlinico (sez. prat.) 32: 277-279 (February 23) 1925.
17. Sorrel, E. and Malgras, P.: Supradural Tuberculoma, Bull. et mem. Soc. nat. de chir. 60:1412 (December 29) 1934.

pulmonary tuberculosis, and in the right lung moderately advanced tuberculosis. Both testes were swollen, and there was pus coming from an incision about an inch and a half long in the left side of the scrotum. The patient left the Anson County Sanatorium without permission March 25, but was returned April 21 to be hospitalized until he could be admitted to the North Carolina Sanatorium. The findings at that time were about the same except for a spontaneous rupture of the right inguinal gland. During his hospital stay he ran a remittent fever of 99 to 101°, with an occasional rise to 102°. He complained of severe headache on May 26, 27, and 28, which was not relieved by the usual analgesics. He became incontinent on July 5, and from then on rapidly grew weaker. He entered the North Carolina Sanatorium July 28.

Physical examination upon admission: The patient was a poorly nourished, acutely ill colored male, weighing 100 pounds. He had a right hemiplegia with hypoesthesia to pain in the right arm and leg. Thermic sensation was not appreciated in this same area. On the right, there were no increased tendon reflexes, ankle clonus and positive pyramidal tract signs were present, and abdominal reflexes were absent. There was anisocoria, with the left pupil dilated, and internal left strabismus and nystagmus. There was marked exopthalmos of the left eye, with choked discs. Tactile anesthesia of the left cheek existed. There was hypoesthesia of the left half of the tongue, which deviated to the right upon protrusion. There was a draining sinus in the right inguinal region and one from the scrotum.

Physical findings in the chest were those of a far advanced bilateral pulmonary tuberculosis with cavitation in the upper half on each side. Chest x-rays revealed bilateral pulmonary tuberculosis, far advanced on each side, with cavitation in the apices.

The diagnosis was bilateral, far advanced pulmonary tuberculosis, complicated by a tuberculous adenitis, epididymitis and tuberculoma of the pons.

The patient remained in the hospital fifteen days, becoming steadily worse until his death on August 12, 1939. His temperature ranged from 96 to 103, and his pulse averaged 120.

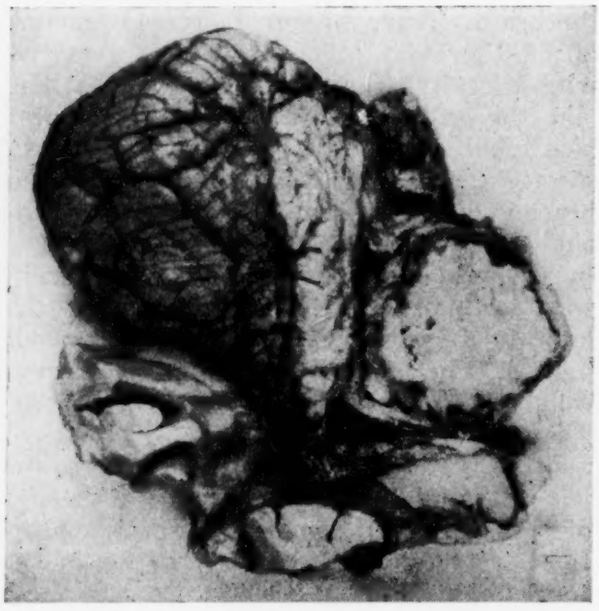
Autopsy: There was a pronounced bilateral exophthalmos. There was a wide incision wound with clean borders disclosing the musculature below in the right inguinal region. A draining sinus was seen in the lower portion of the scrotum, and there was a sinus present in the region of the left cord. Numerous decubitus ulcers were present over the sacral region. The dura showed no abnormalities and stripped with ease from the brain. There was an increased amount of fluid present. The brain was removed with difficulty. The gyri were somewhat flat and the sulci shallow. The left cerebral hemisphere appeared somewhat larger than the right. No mass could be palpated. The arachnoidea was thin and smooth throughout. On inspection no abnormalities appeared in the base of the brain. When the brain was sectioned in the usual manner, the lateral left ventricle was found somewhat dilated. The internal capsule and sub-cortical ganglia presented no gross abnormalities. The third ventricle was somewhat dilated and the posterior portion of the pons to the left of the midline presented a mass the size of a hickory nut, somewhat firm on palpation, protruding into the left portion of the fourth ventricle. The surface of the mass was studded with grayish white nodules the size of a pin head. When cut open, the mass was somewhat yellowish in appearance, with caseous material in the center. The meninges did not appear to be involved. The cerebellum showed no gross pathology. The base of the skull and the skull cap presented no abnormalities.

The lungs confirmed the roentgenological findings.

In the small pelvis to the left of the urinary bladder was found an abscess as large as a hen egg, the contents of which were foul smelling, thick, purulent material. When the bladder was removed small abscesses were encountered to the left of the prostatic portion of the urethra. The bladder musculature was somewhat thickened, and the mucous membranes were injected. No gross ulcerations were visible. The testes were removed and showed no gross abnormalities. Both the right and the left epididymis were beaded and enlarged, and when they were opened, frank pus was expressed from the lumen. On the right kidney a bean sized tuberculoma was seen extending from the

medulla to the pelvis. The center of the tuberculoma was caseous.

Sections from the brain presented a conglomerate tuberculoma with occasional giant cells lying just at the periphery of the central necrosis, about which were layers of epitheliod cells and round cells. Sections from the kidneys and lungs showed much the same picture.



Photograph of the brain, showing a section through the hind brain. The tuberculoma can be seen in the left half of the pons.

Complete anatomical diagnosis:

1. Cachexia.
2. Bilateral, chronic cavernous apical tuberculosis with bronchogenic dissemination in both lungs.
3. Tuberculoma of the pons varolii.
4. Bilateral tuberculous epididymitis with draining sinus.
5. Tuberculoma of the right kidney.
6. Tuberculous lymph-adenitis with rupture through the skin in the inguinal region.

The Physician's Reward.—In the practice of medicine it is all too often the case that no monetary recompense is received at all, and more frequently the recompense is wholly inadequate to the value of the services rendered. The physician does not consider that he is receiving a **quid pro quo** when he is paid by his patient. It is not that he sells his opinion at so much a yard. He is entitled to a living, yes, but more than that he takes a satisfaction in seeing that the results of his advice have brought aid and comfort to the person who sought it.—Winfred Overholser: The Broadening Horizons of Medicine, Science 90: 2338 (Oct. 20) 1939.

DUKE HOSPITAL CLINICO-PATHOLOGICAL CONFERENCE

NOVEMBER 22, 1939

Dr. Hanes (reading the clinical summary*): The patient was a thirty-nine year old colored man who was admitted because of pain behind the sternum for one week.

Family history was non contributory.

Marital history: His wife had been five times pregnant. The last three pregnancies terminated in miscarriages at five or six months.

Past history: General health had been excellent. The right ankle was fractured ten years ago, and since that time had become slightly swollen and painful during damp weather. He had had few upper respiratory infections and gave no history of rheumatic fever. He had had several root abscesses. About fourteen years ago, at the age of twenty-five, he had an episode of mild pain behind the sternum which he thought was "indigestion"; this persisted for two or three days. During the past two years he had had two blood Wassermanns, both of which were negative. There was no history of gonorrhea and no recent weight loss.

Present illness: One week previous to admission he began to have "choking sensations" behind the sternum after having eaten corn for supper. He attributed this to "indigestion" and took "Black Draught", castor oil, etc. After that he had three or four bowel movements daily, in spite of which the "indigestion" continued. On the day previous to admission he experienced slight pain in the region of his second lumbar vertebra, which persisted throughout the day. Because of this he ceased working early in the afternoon. He had worked regularly until that time, and during the week he had gotten wet in the rain several times. On the evening previous to admission he noted sharp, catching pains behind the sternum which were worse on inspiration and tended to make him short of breath. This pain had persisted with varying degrees of severity. On the morning of the day of admission he awoke with pains in the right hip, right ankle, left knee and fourth finger of the left hand. He was hardy able to walk all day. He had had no chills. The temperature had not been

*The clinician had not seen the patient and his only information was obtained from the clinical summary.

taken but he "felt hot" for two days previous to admission.

Physical examination: Temperature was 39.9°C; pulse, 118; respiration, 28; and blood pressure 120/80. The patient was an obese negro male of thirty-nine years who did not appear particularly ill. The skin was warm and dry. There were no eruptions. The axillary lymph nodes bilaterally were barely palpable. Movements in fourth finger of left hand were painful. On motion of the right hip he complained of pain localized mainly at the midportion of Poupart's ligament. There was no joint tenderness. The left knee joint contained a small amount of fluid, and there was slight increase in temperature about the joint, movements of which were painful. The right ankle was slightly swollen, with slight increase in local heat, and there was marked pain on motion of the joint. The teeth were dirty, worn and carious, and several were broken off even with the gums. There was marked peridental recession. Tonsils were small and pale. The posterior pharyngeal wall was clean and not reddened. The neck veins were not distended. Lungs were clear. The cardiac border could not be definitely determined, because of the thick chest wall, but the heart seemed to be within the outer limits of normal size. The heart sounds were quite distant; the rhythm, regular. A soft apical systolic murmur was heard. No friction rub was heard. The abdomen was negative; genitalia normal; rectal examination negative. There was no peripheral edema. Reflexes were normal.

Accessory clinical findings: Blood: Hemoglobin was 14.3 grams or 92 per cent; red blood cells, 5,030,000; white blood cells, 10,050. Polymorphonuclear leukocytes, 82 per cent; large lymphocytes, 5 per cent; small lymphocytes, 10 per cent; monocytes, 3 per cent. A smear was not remarkable. A sickle cell preparation was negative. The sedimentation rate was 42 mm. per hour, corrected. Wassermann and Kahn reactions were negative. Urine: Albumin 1 plus; 3-5 white blood cells to the high power field in centrifuged specimen. A routine blood culture was negative. Fluoroscopy and film of the chest showed diffuse mottling throughout both lungs which was thought to be consistent with bronchial pneumonia or passive congestion. The heart was diffusely enlarged. X-ray of the left knee showed nothing abnormal. X-ray of the right ankle revealed an old, healed osteomyelitis, involving the distal end of the tibia. An electrocardiogram, made one and one-half hours before the death of the patient, revealed P-R interval 0.24 seconds. There was no definite axis deviation. T 1, 2 and 3 all showed elevated segments with upright T waves.

Course in the hospital: The patient was given complete bedrest and put on soft surgical diet. Fluids were forced. He was started on aspirin, which afforded almost complete relief, both from the joint pains and chest pain. On the following morning the most painful joints seemed to be the left hip and right knee. There was very little pain in the right hip. The patient, when seen at 3 p.m. of the second hospital day, remarked that he felt well enough to go home. At 3:30 p.m. the nurse heard him gasping for breath. He made eight to ten gasping efforts and then ceased to breathe.

From the information furnished us in this clinical summary we are justified, I believe, in saying that this colored man of thirty-nine was suffering on admission from an attack of acute rheumatic fever. We should note carefully the history of "an episode of mild pain behind the sternum" which he suffered at the age of twenty-five, for it is probable that this is intimately connected with his present illness, both being due to rheumatic heart disease. The "sharp, catching pains behind the sternum which were worse on inspiration, and tended to make him short of breath" preceded by a few days the polyarthritis of his present illness, and strongly suggest pericarditis as the cause. The electrocardiographic findings support this view.

We are told that a "soft, apical systolic murmur was heard", which may have been caused by a vegetative endocarditis of the mitral valve. It is highly probable, then, that the heart was the site of a rheumatic pancarditis—pericardium, myocardium and endocardium being involved in an acute inflammatory lesion, grafted upon an older injury to the heart produced by the rheumatic attack fourteen years before. As you know, it is not at all uncommon for the heart to be seriously affected in rheumatic fever with no involvement of the joints whatsoever.

Acute rheumatic fever is so serious and disabling a disease that physicians can never have it brought to their attention too often, but the point of unusual interest in this case

is the manner of death. This was sudden and totally unexpected, and leads us to a brief consideration of sudden death in general. A very excellent article on this subject by Dr. Louis Hamman[1] has furnished the statistical material which I have placed on the blackboard. Dr. Hamman has analyzed 700 cases of sudden death reported in the literature, the diagnoses having been established by autopsy. Of these, 637 (91 per per cent) died of:

(1) Sudden cardiac failure	(65%)
(2) Hemorrhage	(21%)
(3) Arterial embolism and thrombosis	(5%)

You will note that these figures strongly support the clinical aphorism that sudden catastrophes in the body are preponderantly vascular in origin. "Sudden cardiac failure" is further analyzed into:

(1) Coronary artery disease	(65%)
(2) Valvular heart disease	(21%)
(3) Myocardial disease	(10%)
(4) Cardiac hypertrophy	(3%)

But what is the exact mechanism of cardiac failure? Observations upon animals, with experimentally produced closure of a coronary artery, have thrown much light upon this question. Let me quote directly from Dr. Hamman's article: "If we look at the exposed heart of an animal which has been seriously damaged, let us say by cutting off a large part of the coronary circulation, we shall notice the following sequence of events. At first, occasional extra-systoles occur which become more and more frequent; there follows a period of ventricular tachycardia during which the rate may become excessively rapid, producing a genuine flutter; finally, all effective contractions cease and only fibrillary twitchings agitate the surface of the ventricles. This mechanism develops in the experimental animal when the faradic current is applied, when the coronary circulation is interfered with, when certain drugs are administered, digitalis, chloroform, adrenalin, etc., and frequently during various experimental procedures when no satisfactory cause for it can be assigned. As long ago as 1888 McWilliam suggested that the occurrence of ventricular fibrillation might explain sudden cardiac death in man and since the electro-cardiogram has come into use, the suggestion has been amply verified."

1. Hamman, Louis: Sudden Death, Johns Hopkins Hospital Bulletin, 55:387, 1934.

Diagnosis

Dr. Hanes: I believe that this man had chronic rheumatic fever which had existed for a number of years with both myocardial and valvular damage. Recently there was an exacerbation of the rheumatic fever which so disturbed the function of the heart as to lead to ventricular fibrillation and death.

Dr. Schulze: The surprising thing was the picture presented by this patient while under observation. He was a robust, 250 pound negro, who did not think he was ill. We thought he had rheumatic heart disease, but did not feel that he was very seriously ill. While he was being x-rayed the day after admission, I saw him and asked him how he felt. His reply was that he felt very well. He was sent back to the ward, and a few minutes later he was dead. The suddenness of his death was entirely unexpected by those of the house staff who examined him.

Necropsy Findings by Dr. Sprunt

Anatomical Diagnosis: Acute and chronic rheumatic fever; acute and chronic rheumatic myocarditis, pericarditis and mitral endocarditis; cardiac hypertrophy; multiple petechial hemorrhages in heart; slight passive congestion of viscera; fibrous pleural adhesions.

Gross Morbid Anatomical Changes: The pericardial sac contained 3 cc. of cloudy yellow fluid. A smear of this material showed no bacteria, and cultures of it remained sterile. The epicardium was roughened with a fibrinous exudate, and there were numerous petechial hemorrhages. The heart weighed 500 grams (the patient's weight, 100 kilos). The hypertrophy was largely due to an increase in size of the left ventricle. The valves showed no abnormalities except a small lesion 3 mm. above the free edge of the mitral valve. The mural endocardium of the ventricles and auricles showed no lesions aside from numerous petechial hemorrhages. The coronary arteries were not grossly changed. The lungs crepitated throughout and were not edematous. No evidence of passive congestion or other gross changes were seen in the other thoracic and abdominal viscera. Permission to remove the brain was not obtained.

Microscopic Anatomical Changes: Some fibrinous exudate was present in the epicardium, and numerous petechial hemorrhages were seen. The epicardium was infiltrated with a number of cells. These were divided about equally between polymorphonuclear leukocytes and mononuclear cells. Many of the latter were typical macrophages. The coronary arteries showed a slight proliferation of the intimal cells. The myocardium was extensively damaged. There were numerous focal areas of necrosis, some of which were infiltrated with cells similar to those described in the epicardium. In addition to these there were some old fusiform scars around the smaller blood vessels similar to those seen in healed rheumatic fever. There were no typical Aschoff bodies but some lesions which resembled these. The lesion on the mitral valve was composed of dense fibrous tissue and collagen. On the edges of this were numerous cells. These cells were similar to those described above. No bacteria were seen in any of the sections.

Microscopic preparations of the other organs showed the splenic sinuses packed with red blood cells. The hepatic sinuses around the central vein were also slightly dilated. Aside from these, there were no other changes of interest.

Discussion

Dr. Sprunt: The interpretation of the case is that this patient had had some years previously an attack of rheumatic fever which damaged the myocardium and resulted in cardiac hypertrophy. The valves were not damaged functionally at all, although we did find a small old lesion on the mitral valve. That a practically complete recovery was made from this former attack is evidenced by the lack of typical Aschoff bodies.

Recently the patient had an exacerbation of the rheumatic fever, which led to acute damage to the myocardium and sudden death. The evidence that these lesions are rheumatic in nature rests on the fact that they are similar to the ones described as occuring in rheumatic fever and on the fact that bacteria are absent.

Dr. Hanes: It may be interesting to recall the case of a woman who died suddenly in the hospital last year of hyperparathyroidism. There was calcification in various organs with degeneration and calcification of the muscle fibres of the myocardium.

Dr. Sprunt: I recall also a case of sudden death in a patient with tuberculosis who had extensive tubercular myocardial damage.

Dr. Hanes: This patient, then, very probably died of ventricular fibrillation, the result of an acute exacerbation of an old rheumatic fever which seriously damaged the myocardium.

PHENOL GANGRENE COMPLICATING DIABETES MELLITUS

VERNE S. CAVINESS, M. D., F.A.C.P.

RALEIGH

Gangrene in diabetics is of such relative frequency that it is quite easy to attribute all such occurrences to diabetes. Uncontrolled diabetes is responsible for most cases of gangrene in diabetics, but undoubtedly there are other cases that are incidental to diabetes. Excessive lipemia and hyperglycemia are potent causes of arteriosclerosis and gangrene. Nothing should prevent the proper attention to these factors in a diabetic; equally interesting and important should be the determination of other causes.

Arteriosclerosis

In the large arteries—the elastic arteries—atheromatous plaques deposited in the intimal coat are the characteristic forms of arteriosclerosis. This process appears to be associated with errors of fat metabolism.

In the smaller arteries and in the arterioles—the muscular arteries—arteriosclerosis appears as calcification in the muscular coat. There is often an associated fibrosis of the muscular coat. The fibrosis appears to follow necrosis of muscle cells, often resulting from continued muscular strain—as in hypertension.

Diabetic patients usually show a combination of these two types. In the muscular coats of arteries and arterioles we find fibrosis and calcification with atheromatous deposits in the intima. According to Warren[1], this is an intimal type of arteriosclerosis, and may show "local thickening and hyaline changes of the intima with lipoid infiltration, the presence of cholesterol crystals or calcified deposits." These changes appear to occur with variations in any arteries.

Diabetic gangrene is the result of intimal thickening, usually gradual in development,

1. Warren: The Pathology of Diabetes Mellitus, Philadelphia, 1938, p. 128.

but often precipitated by injury or infection in uncontrolled diabetes.

Prior to the use of Protamine Zinc Insulin, all diabetics of any age who survived as long as five years developed arteriosclerosis. With the increasing use of Protamine Zinc Insulin and a wider recognition of the importance of keeping blood sugar at a normal level at all times, there has been a sharp drop in the incidence of arteriosclerosis in diabetics[2]. However, since diabetes is especially likely to develop at about the sixth decade of life, arteriosclerosis will inevitably develop in many diabetics, independently of the diabetes. Furthermore, no treatment of diabetes can prevent the development of arteriosclerosis in all cases. Hence, there must always be a small incidence of arteriosclerotic gangrene in diabetics as well as in non-diabetics.

Phenol Gangrene

Since the end of the carbolic acid era in medicine and surgery, there have been relatively few cases recognized as phenol gangrene. During this era, such cases were frequent and the literature on the subject was voluminous.

Gangrene is produced by dilute forms of phenol. A 5 per cent aqueous solution is a saturated solution. Gangrene has usually been produced by 1-5 per cent preparations. Phenol is used frequently as a local application for the relief of itching. Usually gangrene does not follow its use. Whether or not gangrene develops seems to depend on the strength of the phenol preparation, on the length of time of the application, on how closely it is confined, on the power of resistance of the skin of the individual (80 per cent of the cases occur in women), on the age of the patient, on the climate, and possibly on the amount of pre-existing arteriosclerosis.

The gangrene appears to be produced by direct action of phenol on tissues. Phenol precipitates proteins, whether in solutions or in living cells. It is not a self-limiting caustic and does not enter into any stable combination with tissue proteins; hence, it penetrates more deeply into the tissues than other antiseptics[3 4 5].

2. Warren, p. 121.
3. Cushney's Pharmacology and Therapeutics, Philadelphia, Lee and Febiger, 1928, p. 140.
4. Harrington: Carbolic Gangrene, Am. J. M. Sc. 120:4, 1900.
5. Levai, Josef, Gyogyaszat, 37:75-94, 1897.

Edema of the cellular tissue is produced, blocking the circulation by mechanical pressure[6]. As arterioles and arteries become involved, edema of the intimal coat obstructs blood flow mechanically in addition to thrombus formation along the site of intimal inflammation.

Phenol gangrene is a caustic process rather than a pure phenol phenomenon. A very similar gangrene is produced by 5 per cent solutions of hydrochloric acid, nitric acid, sulphuric acid, acetic acid or caustic soda or potash when applied to an extremity as a wet dressing for twenty to twenty-four hours.

Case Report

History: Mrs. H. H. G., a white female, age forty-seven, was admitted to Rex Hospital July 15, 1939. She gave a history of having had diabetes for about three years with relatively little treatment. She had not used insulin, and her diet had been very lax. Occasionally she consulted a physician, but did not follow his instructions.

Six weeks before admission she developed a vesicular rash with itching on her right second toe. She used various remedies with no noticeable effect. On July 10, 1939, five days before admission to the hospital, she consulted her physician, who prescribed an ointment containing phenol 5 per cent, iodoform, and zinc oxide, to be applied locally night and morning. The ointment was applied heavily, a dressing of cloth was wrapped about the toe, and a shoe worn daily as she went about her work.

Almost immediately, the toe began to swell and became grayish red. The swelling and redness extended along the right foot to the ankle. Pain, throbbing in character, was constant. Afterwards, the toe turned a dark bluish color.

Physical Examination: On admission to the hospital, the patient presented a toxic appearance, though apparently not threatened with coma. Her temperature was 100.8° F.; pulse, 120; respiration, 30; blood pressure, 160/80. She was still slightly overweight after losing weight gradually for three years. Fundi occuli were normal. All teeth had been removed and replaced by plates. Tonsils had been removed. Her thyroid was palpably enlarged. The aortic

6. Steel, William A., in Cyclopedia of Medicine, Philadelphia, F. A. Davis and Co., vol. 6, p. 15.

second sound was accentuated. Peripheral arteries appeared to be normal. Both dorsalis pedis arteries were palpable and easily compressible. The right second toe was bluish in color in some areas, red and swollen in appearance in others.

Later her toe became dark blue in color with gangrenous areas. The foot showed marked induration about the base of the toe with redness and swelling along the foot to the ankle. Pain was severe. Periostitis developed under the gangrenous areas and was resistant to treatment.

These pictures show gangrene with areas of normal tissue in the toe. There are definite evidences of dermatophytosis, especially about the great toe nail. Note induration about the base of the toe.

These pictures are good examples of the way diabetic feet should not appear.

Laboratory Findings: On admission to the hospital, the patient's urine contained a very large amount of sugar. Her blood sugar was 200 mg. Her renal threshold was 190 mg. Her blood count showed a moderate leukocytosis. Under treatment, her blood sugar quickly became normal and remained normal.

Operation: Due to extensive gangrene and periostitis it was decided to amputate the toe, partly as an economic measure to shorten hospitalization. While some areas about the toe remained normal, the involvement was so extensive that many months would have been required for healing.

On August 5, 1939, the toe was amputated under local anesthesia.

Subsequent Course: After discharge from the hospital, she continued to improve until the foot was entirely well and she could walk comfortably. Afterwards, she reduced the dose of insulin or took it irregularly, and now she has become quite lax regarding insulin and diet. She has not returned for a re-check of her blood sugar level.

Dermatophytoses

Because of the high incidence of dermatophytoses affecting chiefly fingers and toes and the tendency of many physicians to use phenol in local applications for the relief of such conditions, a warning regarding the dangers of phenol appears to be timely. The danger is greater in diabetic patients.

Summary

A case of phenol gangrene occurring in a diabetic patient is reported with a discussion of gangrene in diabetics from an etiological standpoint.

The Main Function of the Medical Profession.—Even the most forward-looking medical man must admit that for a long time to come, the main function of the medical profession will be to heal, relieve and comfort those who are sick or in distress, and plans which are devised to readjust the relationship between doctors and laymen must be based primarily on this consideration. New needs and opportunities are to be recognized and met as well as possible, but the chief thing is to be certain that in the name of the newer "Service" with its capital "S", nothing of the old-fashioned, modest but effective service of doctor to patient is lost.—Peabody, Francis W.: Doctor and Patient, New York, The Macmillan Company, 1939.

CORRESPONDENCE

Dear Dr. Johnson:

The first two issues of your journal are so superior to many state journals, that it seems unfortunate to have such an editorial as that in the February number on the "Scarcity of Doctors". Don't you think that it is rather unfair to attribute that condition and the present health of the German people to the system of socialized medicine, which they adopted over fifty years ago, when you cite the mobilization of physicians and the malnutrition and epidemics arising from the war? You also quote the laws of *last year* which reduced the course of medical study and legalized the activities of "quacks". In addition to these factors, you are probably aware of the sub-standard way of living to which the Germans were subjected during the war of 1914-'18, which was the real cause of their defeat and which persisted after the Treaty of Versailles and during their periods of inflation and depression, up to the present time. Wouldn't it have been fairer to have examined the health records of Germany for the years prior to 1914?

I hope you do not find it necessary, as the editor of a state journal, to follow in the wake of Dr. Fishbein, with his misrepresentation of the experience of Europe, including Germany before Hitler and England since 1911! Are you aware that the British Medical Association is strongly advocating the extension of its panel system to cover the families of workers and to provide all forms of care, including hospitalization? Evidently they recognize its worth. I should think that a new journal would take a more independent view of the social problems of medicine than to blindly fall into the ruts made by others.

With best wishes for continued success of The Journal, I am

Very sincerely yours,

KARL SCHAFFLE.

P. S.: As for Russia, its health has been vastly improved by socialization. That is a fact and not an inference.

A STATEMENT FROM DR. W. Z. BRADFORD

Repeated studies of maternal welfare and maternal mortality by individual physicians and critical analysis of vital statistics reveal that the high mortality rate in North Carolina is intimately related to social and economic factors peculiar to the southern states. Efforts to improve this condition must take cognizance of these sectional characteristics; hence methods of approach as adopted in other localities are not necessarily applicable to North Carolina. Among our local problems might be mentioned:

1.—A low per capita wealth, making it difficult for many people to obtain adequate medical care and producing a large number of medically indigent individuals.

2.—A widely scattered rural population—85 per cent of the inhabitants residing in communities of less than 10,000 population.

3.—A midwife system delivering 30 per cent of the population under limited control and with inadequate supervision, with no general method of removing from their care the abnormal or potentially pathological case.

4.—An inadequate or completely absent public health service in many counties and inadequate medical facilities in many others.

The complaint of the medical profession generally has been that the bad risk patient in the medically indigent group is always presented to him following neglect, or negligent midwifery.

The experience of Moore County is worthy of mention. It has had over 1000 consecutive deliveries without a single maternal death in a rural county which a few years ago had a maternal mortality rate of over 16 per 1000. A trained nurse midwife from the Lobenstein Clinic has developed a program of supervision and teaching of midwives, with a regulation of midwife practice that is applicable to every county of the state.

The current trends in maternal welfare as outlined in the proposed procedures of the United States Childrens Bureau project a wide expansion of federal interest in this field. Among the policies are included postgraduate education and training for full-time nursing personnel of state or local health agencies.

Therefore I urge the North Carolina Obstetrical Society to adopt an active policy in this matter, to wit:

Item 1. An expression as to the dire necessity and need for trained nurse midwives as full time supervisors of midwife teaching and practice in various counties of North Carolina.

Item 2. Approval of the establishment of facilities for practical training in this field in North Carolina—possibly as a course in the North Carolina Public Health School at Chapel Hill with additional practical training elsewhere.

Item 3. Recommendations that the State Board of Health and the Childrens Bureau participate in the training and possibly aid in such a program subsequently when local county economy might object to participation during a developmental period.

Item 4. Active participation and consultation with the current maternal welfare program of the North Carolina State Board of Health by the designation of a fact finding committee.

BULLETIN BOARD

The question of whether or not to include physicians' fees in addition to the cost of hospitalization in our Hospital Saving Association and other similar Associations will have to come up for discussion in the House of Delegates at Pinehurst in May. The commercial companies are selling doctors' services along with hospitalization, and this will force our hand either to do the same thing or to notify these commercial companies that we will not cooperate with them. I suggest that all County Societies thrash this matter out at home and instruct their Delegates what they wish done.

WILLIAM ALLAN.

NOTES FROM THE SECRETARY'S OFFICE

The problem of some form of medical service plan for low income groups has finally been forced upon the members of the medical profession of North Carolina. A commercial insurance company has written a medical, surgical, and hospital contract to cover the employees of a large industrial concern, causing this group to cancel its hospital service contract. In another industrial city the employees of a great textile concern are considering similar action. Needless to say, these situations have caused great apprehension in the sections of the state affected.

Dr. F. Webb Griffith's Committee on Socialized Medicine and Dr. D. W. Holt's Committee on Public Relations, as well as committees from both the Hospital Saving and the Hospital Care Associations, have been working on medical service plans to be submitted to the House of Delegates. All of these committees are unanimously of the opinion that the time has come for the medical profession to take action and keep this problem in its own hands. Similar plans are already in effect in other states, but they have been in operation such a short time that correct actuarial estimates are not available. This whole subject is fraught with many possibilities of good and evil, and it behooves the medical profession in those communities directly affected, as well as the rest of us, to be patient and to wait the findings of the committee and the action of the House of Delegates.

The Warren County Medical Society has been reorganized with Dr. G. H. Macon of Warrenton as President and Dr. H. H. Foster of Norlina as Secretary.

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The doctors throughout the state will be glad to know that Dr. W. I. Wooten of Greenville has announced himself as a candidate for the House of Representatives from Pitt County.

NEWS NOTES FROM DUKE UNIVERSITY SCHOOL OF MEDICINE AND DUKE HOSPITAL

On February 26, the Nu Sigma Nu Medical Fraternity held in the Duke Hospital amphitheatre an informal round table discussion on the "Problems of a Young Doctor in Private Practice". Participating in the panel were Dr. Wingate M. Johnson, of Winston-Salem, Editor of the North Carolina Medical Journal and former President of the State Medical Society; Professor Harold Meyer, Sociologist of the University of North Carolina; Professor Douglas B. Maggs, of the Duke University Law School; Professor Leroy Lewis, Instructor in Public Speaking at Duke University; and Dr. W. C. Davison, of the Medical School. Questions included in the discussion brought up matters of professional ethics, legal, social, and business aspects of medical practice.

On February 27, Dr. W. M. Firor, Acting Professor of Surgery, The Johns Hopkins University School of Medicine, held a clinic on "Burns".

On February 29, the Durham Drug Association held a meeting at Duke Hospital, at which Professor David F. Cavers, of the Duke University Law School, Mr. F. O. Bowman, Attorney for the North Carolina Pharmaceutical Association, and Hon. Carl Durham, Congressman from this district, gave talks on the important phases of the new food, drug and cosmetic legislation.

On March 12, Dr. Mark V. Ziegler, Assistant Surgeon, U. S. Public Health Service, lectured on Opportunities in the United States Public Health Service.

On March 13, Dr. Halbert L. Dunn, Chief Vital Statistician, Census Bureau, Washington, D. C., lectured on Vital Statistics and Death Certificates.

On March 15, Dr. Arthur M. Shipley, Professor of Surgery, University of Maryland Medical School, Baltimore, held a clinic on "Traumatic Wounds of the Abdomen and Chest, and Suppurative Lesions of the Lung, Mediastinum, and Pericardium".

A grant was made by the Rockefeller Foundation to Duke University for one year in support of the investigation of the problems of physical chemistry by Dr. Hans Neurath, Assistant Professor of Biochemistry.

A Field Nutrition Study has been established at Duke University in cooperation with the Rockefeller Foundation and the State Board of Health. Sera coming from a survey area in a rural section are tested in the nutrition laboratory at Duke, and careful medical and dietetic studies are to be carried on in the field. The plan is to assess the nutrition status of small representative communities by use of all the procedures at present available, and in the light of the results obtained to broaden the program to include larger areas in the state.

Notes from the University of North Carolina School of Medicine

The following members of the faculty attended the meeting of the American Federation of Biological Sciences in New Orleans the week of March 11-16.

Dr. Russell L. Holman, Associate Professor of Pathology, read a paper before the section on Pathology. The subject of his work is "The Influence of Nitrogen Retention Upon the Regeneration of Plasma Proteins".

Dr. H. Ward Ferrill, Associate Professor of Physiology, presented a paper before the American Physiological Society on "The Effect of Daily Insulin Administrations on Growth and Reproduction in Successive Generations of Rats".

Dr. James C. Andrews, and Dr. Granvil C. Kyker, of the Department of Biological Chemistry presented abstracts to the Biological Chemistry Section as follows:

Dr. Andrews: "The Optical Activity of Quinine in Various Solvents".
Dr. Kyker: "Determination of the Concentration of Quinine In Blood".

Thirty-seven students in the second-year class have been transferred to the following four-year schools.

University of Chicago: Rush, Southside; University of Cincinnati, Columbia University, Cornell University, George Washington University (Washington, D. C.), Harvard University, Johns Hopkins University, Jefferson Medical College, University of Louisville, University of Maryland, McGill University, New York University, Northwestern University, University of Pennsylvania, Temple University, University of Tennessee, Tulane University, Vanderbilt University, Washington University (St. Louis), Woman's Medical College of Pennsylvania.

News Notes from the Wake Forest Medical School

Dr. Camillo Artom, Professor of Biochemistry, attended the Federation of American Societies for Experimental Biology and the American Society of Biological Chemists in New Orleans, March 14, 15, and 16. At the meeting he appeared on the program and reported recent research work done at Wake Forest on fats.

Drs. H. M. Vann and R. E. Miller attended the meeting of American Association of Anatomists at the University of Louisville on March 19, 20, and 21.

A new research grant of $2,500 has been awarded to the Department of Biochemistry by the Dazian Foundation for Medical Research.

"Doctors in Other Fields" by Dr. Thurman D. Kitchin, President and former Dean of the Medical School, has recently come from the press. This work is written in Dr. Kitchin's characteristic simple and human style, putting together in a single volume many facts of great interest relative to many eminent scholars who were also physicians. It was published by Southern Medicine and Surgery.

Arrangement has been made for a lantern slide demonstration of the new Hospital and Medical School buildings in Winston-Salem, at the Alumni Banquet to be held at the Carolina Hotel, in connection with the meeting of the Medical Society of the State of North Carolina in Pinehurst, on Tuesday, May 14. Dr. R. B. Wilkins of Durham is President of the Alumni Association.

News Notes from the State Board of Health

The influenza epidemic that swept many sections of North Carolina took a toll of 224 lives in January, 1940, as compared with only 53 deaths from this cause reported in January, 1939.

There was also an increase in pneumonia deaths in January, the total having been 327, as compared with 315 the corresponding month a year ago; while deaths from pulmonary tuberculosis numbered 155, as compared with 146 the same month in 1939.

Deaths from preventable accidents also took an upward turn as 1940 got under way, the total for January having been 142, as compared with 119 a year ago.

There was an increase in both infant and maternal mortality. Deaths among children under a year old in January, 1940, totaled 453, as compared with 411 the corresponding month in 1939, sending the monthly rate up from 64.7 to 67.8. The number of maternal deaths this year in January was 33, against 30 the same month in 1939, making the rate for January, 1940, 4.9, compared with 4.7 a year ago.

The total number of deaths reported in January this year was 3,382, which was 554 in excess of the 2,828 reported in January, 1939. The number of babies born in North Carolina in January, 1940, was 6,680, as compared with 6,352 a year ago, an increase of 328.

Diphtheria deaths in January, 1940, totaled 27, an increase of 8 over the 19 reported for January, 1939, in spite of the State's new law requiring immunization of children between the ages of six months and a year and making immunization a condition for school enrollment.

Dr. Carl V. Reynolds, State Health Officer, has announced the receipt of a check for $200,000 from the Reynolds Foundation for the further prosecution of the anti-syphilis campaign in sixteen North Carolina counties and eight cities.

This amount, Dr. Reynolds pointed out, is an increase of $40,000 over the $160,000 allotted last year and double the original grant, which was $100,000.

Dr. Reynolds pointed out that this fund is being expended in only sixteen organized counties that have matched the Reynolds Fund for the control and eradication of syphilis. There are sixty other counties in the state which are receiving $158,000 from Federal funds made available through the passage of the Lafollette-Bulwinkle Bill. There are still twenty-four counties left which do not participate in either of these funds.

The State of North Carolina appropriates only $25,000, which is used to aid in central administration and the purchase of drugs.

A conference on school health education, called by Dr. Frank C. Foster, dean of education at the Asheville Normal and Teachers College, was held at Asheville in March. Dr. Carl V. Reynolds delivered a brief address on "The Need for Better Health Service in the Public Schools," and Dr. Walter Wilkins, Coordinator for the North Carolina School Health Service, spoke on "The Coordinated Health Program."

On March 25, Dr. Ernest A. Branch, director of the Oral Hygiene Division of the North Carolina State Board of Health, discussed "The Dental Program of the North Carolina Board of Health" before the Department of Public Health and Preventive Medicine of the University of Pennsylvania and the Philadelphia County Dental Society.

North Carolina Conference for Social Service

Meeting April 21-23, at the Robert E. Lee Hotel and Centenary Methodist Church in Winston-Salem

TENTATIVE PROGRAM

April 21—Sunday.

Registration—4:00-6.00 p. m. (Registration at the hotel and the church throughout the Conference)
8:00 p. m.—Sermon—Dr. G. Ray Jordan—Centenary Methodist Church, Winston-Salem, N. C.

April 22—Monday.

9:00-10:45 a. m.—Meetings of the Affiliated Organizations.
11:00-12:45 a. m.—General conference.
a. Better Care of Mothers and Babies—Dr. G. M. Cooper.
b. North Carolina Clinics.
1. Birth Control Clinics.
Dr. Bayard Carter, Duke University.
2. Diphtheria Clinics—Dr. Jay M. Arena, Duke University.
3. Venereal Clinics—Dr. J. C. Knox.
1:00-2:15 p. m.—Luncheon.
Subject—Diet.
2:45-4:45 p. m.—Selected Committee Reports
a. Rural Health—Dr. S. H. Hobbs, Jr.
b. Negro Health—Dr. N. C. Newbold, Dr. W. J. Hughes.
c. Mental Hygiene—Dr. Richard F. Richie.
d. Education—Integration of Public Schools with State Department of Health—Mrs. Rosa B. Parker.
6:15—Dinner.
Social Program—Dr. Howard Rondthaler, Toastmaster.
8:00 p. m.—Vice-President, Dr. Bradway, presiding.
a. President's Statement (10 minute statement concerning the work of the Conference).
b. Address—Dr. Thomas Parran—Introduced by Governor Hoey.

April 23—Tuesday.

9:00-10:00—Committee reports.
Resolutions—Dean M. T. Van Hecke, Chapel Hill
Membership—Miss Chloris Kellum, Raleigh
Nominating—Dr. W. C. Jackson, Greensboro.
10:00-12:30—Hospitalization and Medical Care.
a. What is adequate hospital and medical care and how is it being achieved in North Carolina?
Dr. F. V. Altvater, Duke University.
b. Panel—How to Achieve Hospitalization and Medical Care for All Citizens.
Dr. Fred Hanes, Presiding
Dr. Hugh Cabot
Dr. Wingate Johnson
Dr. Haven Emerson.
1:00-2:30—Luncheon—Housing—Mr. T. S. Johnson, Presiding.
Mr. Langdon Post, New York City, Housing Authority.
2:30—Business Meeting.

Mecklenburg Tuberculosis Sanatorium

A $35,000 addition to the Mecklenburg Tuberculosis Sanatorium in Huntersville is being constructed. The new building will be used for negro patients. According to the **Bulletin for the Mecklenburg County Medical Society** this will bring the expenditures for hospital construction in Mecklenburg County for 1940 to one and three quarter million dollars.

Buncombe County Medical Society

At the first March meeting of the Buncombe County Medical Society, held on March 4, the Medical Economics Committee presented the problem of medical insurance to the Society. At the second meeting, on March 18, Dr. Frank Howard Richardson gave a talk on "Marriage Counseling".

Forsyth and Guilford County Medical Societies

A joint dinner meeting of the Forsyth and Guilford County Medical Societies was held at the Robert E. Lee Hotel in Winston-Salem on March 20. Guest speaker of the evening was Dr. Walter C. Alvarez, Professor of Medicine at the University of Minnesota Medical School, and Senior Consultant in the Division of Medicine at the Mayo Clinic, Rochester, Minnesota. Dr. Alvarez spoke on "The Type of Patient Who Won't Get Well In Spite of Much Treatment."

Mecklenburg County Medical Society

The Mecklenburg County Medical Society resumed its regular bi-monthly meetings on March 26. Three papers were presented at that time. Dr. Graham Reid discussed "Medical Treatment of Massive Gastric Hemorrhage"; Dr. James Gibbon spoke on "Post-Operative Gastro-Jejunal Ulcers"; and Dr. W. S. Cornell discussed the "Selection of Patients with Gallbladder Disease for Surgery". Dr. Robert Thrift Ferguson, of Charlotte, has recently been elected president of the Society.

News Notes

At a recent meeting of the Southeastern Section of the American Urological Association, Dr. Hamilton McKay, of Charlotte, was elected a member of the Executive Committee of the American Urological Association, to represent the Southeastern States. Dr. McKay was also selected on the **Charlotte Observer's** All-American team for civic leadership in Charlotte during 1939.

* * * *

Dr. Paul H. Ringer, of Asheville, addressed the Augusta County Tuberculosis Society on March 28 at Augusta, Ga. His paper was on "Early Diagnosis".

* * * *

Dr. J. S. Brown, Sr., of Hendersonville, who has been a member of the State Society since 1894, did his 5,277th delivery on March 18. Looks like a record for a man in private practice.

According to a death certificate filed with Dr. R. T. Stimpson, Director of the State Board of Health's Division of Vital Statistics, Mary Parks, a negro woman, 112 years old, was found frozen to death at Roaring River, in Wilkes County. The year of her birth was given as 1828, and the death certificate was signed by I. M. Myers, Wilkes county coroner.

The value of Pyrethrum in Scabies is well established through the clinical work of Dr. S. E. Sweitzer. (Scabies, further observations on its treatment with Pyrethrum Ointment. Journal-Lancet, Sept. 1936, Vol. LVI. No. 9. p. 467) who used it on 1213 cases at the Minneapolis General Hospital. See advertisement, page 10.

WOMAN'S AUXILIARY

Officers

President: Mrs. C. F. Strosnider, Goldsboro.
President-Elect: Mrs. C. R. Hedrick, Lenoir.
Chairman of Past Presidents: Mrs. P. P. McCain, Sanatorium.
Corresponding Secretary: Mrs. Jack Harrell, Goldsboro.
Recording Secretary: Mrs. J. D. Freeman, Wilmington.
Treasurer: Mrs. C. E. Judd, Raleigh.

Auxiliary to the Medical Society of the State of North Carolina

Organization 1938-39

Mrs. Joseph A. Elliott, Chairman, 1939-1940

First District

Mrs. H. D. Walker, Councillor, 200 W. Main Street, Elizabeth City.

Second District

Annual meeting November 2, 1939. Mrs. John C. Tayloe, Councillor, Washington. Craven County—Mrs. R. S. McGeachy, president, New Bern; Mrs. Barker, secretary.

Third District

Mrs. J. S. Brewer, Councillor, Roseboro. New Hanover County—Mrs. J. T. Hoggard, president, corner 5th and Orange Streets, Wilmington; Mrs. H. A. Codington, president-elect, Chestnut Street, Wilmington; Mrs. J. B. Cranmer, vice-president, 313 Market Street, Wilmington; Mrs. E. S. Bullock, treasurer, 519 Market Street, Wilmington; Mrs. G. B. Barefoot, secretary, Forest Hills. Sampson County—Mrs. J. S. Ayers, president, Clinton; Mrs. W. P. Starling, secretary-treasurer, Roseboro.

Fourth District

Mrs. M. A. Pittman, Councillor, Wilson. Wayne County—Mrs. D. J. Rose, president, E. Mulberry Street, Goldsboro; Mrs. Irwin Henderson, secretary-treasurer, Eureka; Mrs. A. G. Woodard, treasurer, Goldsboro; Mrs. Charles P. Stevick, *Hygeia* chairman, Goldsboro; Mrs. W. H. Smith, McCain Bed Fund chairman, Goldsboro.

Fifth District

Annual Meeting October 26, 1939. Mrs. W. T. Rainey, Councillor, Fayetteville. Hoke County—Mrs. G. C. Godwin, president, Sanatorium. Robeson County—Mrs. J. A. Martin, president, Lumberton; Mrs. E. R. Hardin, secretary, Lumberton.

Sixth District

Mrs. Ben Lawrence, Councillor, Hayes-Barton, Raleigh. Wake County—Mrs. James J. Combs, president, Raleigh. Person County—Mrs. John H. Merritt, president, Woodsdale.

Seventh District

Annual Meeting November 28, 1939. Mrs. Harry Winkler, Councillor, 2323 Westfield Road, Charlotte. Rutherford County—Mrs. W. C. Bostic, president, Forest City; Mrs. W. A. Elliott, secretary, Forest City; Mrs. M. G. Anders, treasurer, Gastonia; Mrs. F. M. Houser, *Hygeia* chairman, Cherryville. Cleveland County—Mrs. W. J. Lackey, president, Fallston; Mrs. B. B. Matthews, vice-president, Shelby; Mrs. Dwight Bridges, secretary-treasurer, Lattimore.

Eighth District

Annual Meeting first Thursday in March. Mrs. W. P. Knight, Councillor, 720 Summit Avenue, Greensboro. Guilford County—Mrs. A. D. Owenby, president, 2608 West Market Street, Greensboro; Mrs. W. L. Jackson, vice-president, 1100 Forest Hill, High Point; Mrs. A. K. Maness, treasurer, 18 Vine Street, High Point; Mrs. C. W. Durham, secretary, 2511 Berkley Pl., Greensboro; Mrs. E. T. Harrison, program chairman, Ferndale Drive, High Point; Mrs. R. M. Buie, McCain bed, Tabernacle Road, Greensboro; Mrs. J. A. Keiger, loan fund, 1025 N. Elm Street, Greensboro; Mrs. G. G. Perry, arrangement, 802 Chestnut Street, High Point; Mrs. T. M. Staunton, Greensboro; Mrs. J. T. Mann, *Hygeia*, 1206 Johnson Street, High Point; Mrs. J. E. Slate, membership, Greenway Drive, High Point; Mrs. T. D. Tyson, public relations, 1003 Club Drive, High Point; Mrs. Rigdon Dees, publicity, 305 S. Mendenhall Street, Greensboro; Mrs. J. W. Tankersley, membership, Meadowbrook

Terr., Greensboro. Forsyth County—Annual meeting December 12, 1939; Mrs. E. Bruce Brooks, president, 514 Reynolds Building, Winston-Salem; Mrs. Robert McMillan, president-elect, Winston-Salem; Mrs. Carlton Adams, secretary, Winston-Salem; Mrs. C. O. Tehaney, treasurer, Winston-Salem; Mrs. H. W. Goswick, membership, Winston-Salem. Rockingham County — Mrs. John Ray, Leaksville. Wilkes County—Annual meeting in March. Mrs. C. S. Sink, president, North Wilkesboro. Allegheny County—Mrs. G. T. Mitchell, vice-president, Wilkesboro; Mrs. J. H. McNeill, North Wilkesboro.

Ninth District

Mrs. James W. Vernon, Morganton. Caldwell County—Mrs. Ralph Lore, president, Lenoir; Mrs. A. B. Goodman, Sr., secretary, Lenoir; Mrs. Cloin Fetner, treasurer, Lenoir. Catawba County—Mrs. S. C. Nowell, Hickory; Mrs. H. H. Menzies, Hickory.

Tenth District

Mrs. W. C. Johnson, Canton.

IT WON'T BE LONG NOW before the Woman's Auxiliary to the American Medical Association will be convening at the Hotel Pennsylvania, New York City, for their 18th Annual Convention to be held June 10 to 14, 1940. IS YOUR RESERVATION IN? We are sure you will want to stay at the headquarters Hotel Pennsylvania. In order to get a reservation, mail your request today to Dr. Peter Irving, Housing Bureau, Room 1036, 233 Broadway, New York City.

Make plans now to attend the

Auxiliary Meeting

PINEHURST

MAY 14

BOOK REVIEWS

CARDIOVASCULAR-RENAL DISEASE. By Lawrence W. Smith, M. D., Professor of Pathology, Temple University School of Medicine; Edward Weiss, M. D., Professor of Clinical Medicine, Temple University School of Medicine; Walter I. Lillie, M. D., Professor of Ophthalmology, Temple University School of Medicine; Frank W. Konzelmann, M. D., Professor of Clinical Pathology, Temple University School of Medicine; and Edwin S. Gault, M. D., Associate Professor of Pathology, Temple University School of Medicine. Price $4.50. Pp. 227. New York: D. Appleton-Century Company, 1940.

This little volume can be recommended unreservedly to any doctor who wants to clarify his thinking about the most important problem that confronts the medical profession today. "According to the statistics of the Metropolitan Life Insurance Company every other individual in the United States past the age of fifty dies of cardiovascular-renal diseases." As stated under the title, the book is "A clinicopathologic correlation study emphasizing the importance of ophthalmoscopy", and it is an excellent example of the sort of cooperation that should exist between laboratory worker and clinician.

The study is divided into five parts: Hypertensive Cardiovascular-Renal Disease; Essential Hypertension (Nephrosclerosis); Senile Atherosclerosis (Arteriosclerosis); Nephritis; Nephrosis; and Clinicopathological Considerations. A very clear distinction is drawn between true hypertension associated with nephrosclerosis and that occurring as a terminal condition in arteriosclerosis.

As a loyal Tarheel this reviewer was disappointed in two omissions: Dr. William MacNider's important work on the kidney, especially his morphologic theory of immunity, and the notable contribution made by Dr. Boyd Harden in 1936 to the problem of eclampsia and pre-eclampsia.

After reading the book carefully, it is easy to understand why this study was awarded the Frank Billings Gold Medal at the 1938 meeting of the American Medical Association. Any practitioner will be well repaid for reading and re-reading it.

FRONTIER DOCTOR. By Urling C. Coe, M. D. Cloth. Price, $2.50. Pp. 264. New York: The Macmillan Company, 1939.

This is in reality "the story of one of America's last frontiers", and of one of America's last frontier doctors. During the six years that Dr. Coe practiced in the town of Farewell Bend, Oregon, and the surrounding 150 mile territory before the railroad came in 1911, he gathered enough material to fill these 264 pages with hair-raising episodes. It is no wonder that Dr. Coe dared not swap stories with any of the Eastern doctors for fear of being thought a liar. The experiences he had as a "team and wagon" doctor in that pioneer country are such stuff as Westerns are made of.

This book is written in a direct, unpolished narrative style which is well suited to its content. The author shows a knowledge of human nature in all its guises and an unembittered acceptance of its weaknesses. There is an occasional bit of philosophizing and one or two paragraphs in defense of the family doctor. Dr. Coe manages, as few men do, to write of his own experiences without seeming obnoxiously egocentric.

FRONTIER DOCTOR makes excellent recreational reading, whether for the layman or for the doctor.

A TEXTBOOK OF LABORATORY DIAGNOSIS. —Edwin E. Osgood, M. D., Associate Professor of Medicine and Head of the Division of Experimental Medicine, University of Oregon Medical School, Portland, Oregon. Ed. 3. Philadephia: The Blakiston Co. 1940.

The third edition of this book has been thoroughly revised and brought up to date and a considerable amount of new material has been added. The outstanding features of this book are many, the most important perhaps being the thorough discussion of the pathological physiology which is indicated by the results of laboratory tests. Interpretation of these tests, their reliability and accuracy and their significance in various types of disease are gone into with much more detail than in any other book on laboratory diagnosis that we have seen. This is of particular value to the practitioner, primarily not a laboratory man, who frequently does not appreciate the full value or the limitations of tests that he may order. The next most important feature is probably the Index by Diseases which consists of an alphabetical listing of diseases and under them, the various laboratory procedures which are of value in that disease.

The majority of laboratory texts are of minor importance outside the laboratory but this one is of equal value to the clinician and the laboratory worker.

LEGAL MEDICINE AND TOXICOLOGY.— Thomas A. Gonzales, M. D., Chief Medical Examiner of the City of New York; Morgan Vance, M. D., Deputy Chief Medical Examiner of the City of New York; and Milton Helpern, M. D., Assistant Medical Examiner of the City of New York. New York: D. Appleton-Century Company, Inc. 1940. $10.00.

This is a reprinting of the original work. To those who are acquainted with it further words are superfluous. It is probably the leading authoritative American textbook on the subject. It should be the constant companion of all coroners, coroner's physicians, medical examiners, toxicologists and pathologists. The book is based chiefly on the work being done in the Chief Medical Examiner's Office in New York City, and is an outgrowth of the experience of this office since it began operating in 1918. It is full of extremely important information to all those concerned with the investigation of deaths which have taken place under unusual or suspicious circumstances.

THE ESSENTIALS OF APPLIED MEDICAL LABORATORY TECHNIC. By D. M. Feder, M. D. Price $5.00. Pages 234. Charlotte Medical Press, 1940.

This is an excellent book for anyone who is starting a laboratory for the first time. It tells one just what materials are needed and where to get them, and quotes best prices. Techniques for almost every type of laboratory work are given, with many illustrations and drawings which are helpful and explanatory. This volume should make a good text book and prove very useful to the laboratory worker.

Each one of us, however old, is still an undergraduate in the school of experience. When a man thinks he has graduated he becomes a public menace. —The Papers and Speeches of John Chalmers DaCosta, Philadelphia, W. B. Saunders Co., 1931, p. 50.

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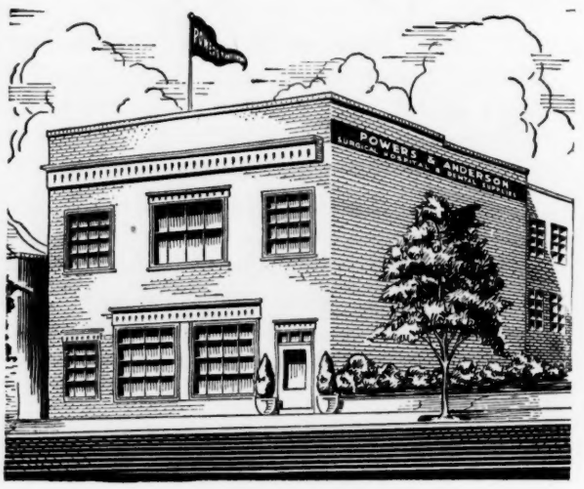

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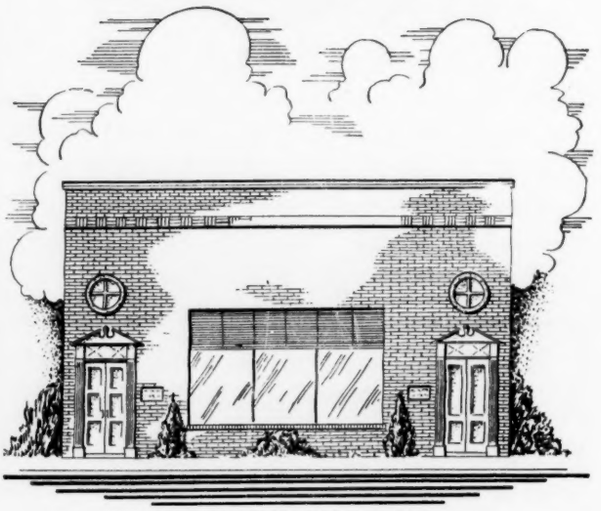

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